IMPROVEMENT OF FOOD SECURITY BY CONSTRUCTING SILOS GRAIN STORAGE AT OLDONYOWAS VILLAGE IN ARUSHA DISTRICT.

ESTOMIH INNOCENT

A DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT FOR THE REQUIREMENTS FOR THE DEGREEE OF MASTER IN COMMUNITY ECONOMIC DEVELOPMENT IN THE OPEN UNIVERSITY OF TANZANIA

2015

CERTIFICATION

The undersigned certifies that I have read and hereby recommend for the acceptance by the Open University of Tanzania (OUT) a project entitled, Improvement of food security in Arusha by constructing silos grain storage at Oldonyowas village in Arusha District in Arusha Region, Tanzania, in partial fulfillment of the requirements for the degree of Master of Community Economic Development of the Open University of Tanzania.

_____

Dr. Felilcian Mutasa

(Signature)

_____

Date

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DECLARATION

I Innocent, Estomih declare that this CED project report is my own original work and that it has not been presented and will not be presented to any other university for similar or any other degree award.

_____

Signature

_____

Date

DEDICATION

I dedicate this accomplishment to my lovely late father Mr. Estomih Lo-thang, who was the main source of my academic achievementalso my mother Martha A, brother Goodluck E. and my lovely wife Blandina K. who supported me morally andfinancially from beginning of my Masters studies to this end.

AKNWOLEDGEMENT

First, I would like to thanks God Almighty for giving me the grace and the opportunity to study Masters Programme. I would also like to pass my appreciation, gratitude and thanks to my Supervisor, Dr. Felician Mutasa for all the help, guidance and effort he put at my disposal to help me complete this work. Again I would like to thanks the team at ECHO East Africa headed by Erwine Kinsey for making time to supply me the data for my work. Oldonyowas community and its leadership and all project stakeholders, I am grateful to you for your cooperation and encouragement which inspired me in this Project.

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Finally, I would like to thanks my mother, Martha Andrew Sengeng,for her support which have seen me to this far. God bless you. I also thanks all the clients who sacrificed their time to respond to the interviews.

ABSTRACT

A dissertation on Improvement of food security by constructing by constructing silos grain storage at Oldonyowas village in Arusha district in Tanzania is one of the needs derived from Community Needs Assessments (CNA) conducted in Oldonyowas village in Arusha district. The CNA exercise was conducted which came up with the community needs and problems, the main problem unveiled with CNA exercise which faces majority community members in Oldonyowas Village was the prevalence of food insecurity. Though among activities Oldonyowas community members do is farming which contribute to their household food security. However, food crops have been facing the problem of post-harvest lose. Under this study there were four objectives which set to facilitate solving the problem, these are; Sensitizing the Oldonyowas community members on silos grain storage project , Facilitating on building skills and knowledge on managing silos grain storage project by, To assist in raising fund for successes full intervention on the silos grain storage project, To create reliable market for grain's. Three objectives have been achieved except one objectivewhich was to create reliable market for grains which will be met under the full operation of the project In keeping with the major objective of the project itwas recommended that project stakeholders should consider expansion of grain storage hand in hand with expanding production for the crops to ensure availability of food to all people all over the community. Farmers in the project area should regard silos as one of the effective facility to store crop so that enough food will be found to ensure food security.

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LIST OF ABBREVIATION

DALDO	District Agriculture and Livestock Development Officer
DED	District Executive Officer
DPLO	District Planning Officer
FAO	Food and Agricultural Organization
ADC	Arusha District Council
URT	United Republic of Tanzania
VEO	Village Executive Officer
GDP	Growth Domestic Product
CBO	Community Base Organization
WFP	World Food Program
FGD	Focus Group Discussion
WEO	Ward Executive Officer
O&OD	Opportunity and Obstacle for Development
SPSS	Statistical Package for Social Science
CAN	Community Need Assessment.

CHAPTER ONE

1.0 PARTICIPATORY NEEDS ASSESSMENT

1.1 Background Information

Many efforts to increase the availability of foods of agricultural origin, such as expanding the agricultural frontier, increasing production and productivity (through the green revolution), and using biotechnology have their impact. However, there is a proven, viable alternative, namely reducing losses of basic grains from when they enter physiological maturity until their distribution. Every year, the world loses millions of tons of basic grains, especially in Third-World countries, which makes the social disease of hunger even more deadly (WFP 2009).

The global food security situation and outlook remains delicately imbalanced amid surplus food production and the prevalence of hunger, due to the complex interplay of social, economic, and ecological factors that mediate food security outcomes at various human and institutional scales. A growing population and rising incomes with the resultant nutritional transition of millions more people entering into the middle class are some of the unprecedented challenges that mankind has never handled before. Food production outpaced food demand over the past 50 years due to expansion in crop area and irrigation, as well as supportive policy and institutional interventions that led to the fast and sustained growth in agricultural productivity and improved food security in many parts of the world (FAO 2010).

Agricultural system in Tanzania is largely rain dependent and highly vulnerable to climatic fluctuations (the norm since 1996), especially the semi-arid and arid areas of central and northern Tanzania. Pitiable access to water and declining soil fertility are

the main limiting factors to agricultural production. A large part of the country is considered semi-arid.

Weather patterns have of recent deviated greatly from traditional seasons, and remain to the best part unpredictable. Irrigated land makes up only 4.3 % of the total area. Nevertheless, agriculture accounts for 89% of water used in the country, and contributes not less than 50% of the GDP. Eighty percent of the agricultural production in Tanzania is undertaken by small farmers using simple basic technology (URT 2009).

It should be noted that food security is a worldwide concern for both rural and urban area. Available literature indicates that by the end of December 2004, there were 852 million undernourished people, of whom 96.6% were living in developing countries (FAO, 2004). According to Murray (2002), most people who live in poor countries are engaged in a continuous struggle to secure livelihood in the face of social, economic and often political circumstances. Consequently, these countries face chronic food insecurity because of environmental hardships found in both rural and urban areas (FAO, 2000).

Food insecurity in Tanzania has increased over the recent decade. Number of undernourished people has also increased from 23% to 40% in the past decade, with the average daily per capita calorie supply at 2’054 against the world average of 2’709. Severe underweight afflicts nearly 27% of the under five children, with 42% being under their rightful height. Production of staples in the northern regions of Tanzania has been largely below average, with maize production being 69% under expectations (URT 2010).

It was reported by URT (2005a) that most of Tanzanians living in rural and urban areas are food insecure. As a result, about 47% of total population in the country is undernourished. Furthermore, URT (2005a) argued that at the regional level, it has been established that up to 40% of the population live in food deficit areas; these are areas where production is lower than the consumption requirements.

1.1.0 Village Community Profile

1.1.1 Administrative Structure

Oldonyowas Village is one of 75 Villages in Arusha District situated in Oldonyosambu division, at Oldonyowasi ward. Arusha District is one among 2 District which form Arumeru District formally in Arusha region. It is about 32 KM from Arusha Region headquarters. Oldonyowas Village is one among 7 Villages in Oldonyowas ward which is in Oldonyosambu division. It is located at western part of Arusha District headquarters and it is 25 KM apart. The Village administration structure is Village assembly (Village government), Village Council, Hamlet. Leaders at Village level are Village chairman and the Village Executive Officer (VEO) whereby at the hamlet level the leader is the Hamlet chairperson.

1.1.2 Demographic Features

The Village has 400 households. According to the 2012 statistic extracted from the updated Village register as updated over time, basing on the National census of 2002, the Village has a population of 1200 people whereby 505 are males and 695 are females. The population distribution in the Village is as follows; Children (0-17YRS) were 430 whereby female were 220 and males were 270. Adults who are in working force were 356 whereby 176 Males females 180 Children (0-17YRS) 430 Including 210 Male and 220 females (ADC, 2012).

1.1.3 Ethnicity

Ethnicity wise, the villages comprises of Wamasai and Wameru. The most dominant tribe in the Village is Wamasai who are the native of the area. Other tribes are immigrant from neighboring wards due to economic activities. For the case of religious, the area is dominated with Christians and few people are pagans.

1.1.4 Economic Activities

The people in Oldonyowas Village engage in different economic activities including; farming, Livestock keeping and petty business. Agriculture employs more than 98% of the population (ADC, 2008). In arable farming food crops and cash crops are cultivated by in the Village. Food crops which are cultivated are; Maize, Sweet potatoes, Irish potatoes, beans and carrot. Maize currently has been encouraged to be cultivated with majority. Apart from food crops the Oldonyowas community engages in production of cash crops. The main cash crop cultivated is Carrot along the mountain. The rest of the people are engaged in livestock keeping and petty business.

1.1.5 Social Stratification

The community members in Oldonyowasi Village are composed of youth, men women, children, widow, widower and the children living in danger environment. There are 7 widowers, 67 widows and 79 children living in danger environment whereby females are 41 and males are 38. Among them, 56 children are orphans in which 29 are males and 27 are females (ADC, 2012).

1.1.6. Organization and Management of day to day activities

The host organization is the Oldonyowasi Village Government in which Village Council have been vested the day to day activities which have been conducted on

behalf of the Village government. Village government leaders are Village chairperson and the Village Executive Officer (VEO) who is the secretary of the Village government. The Village Council also is led by the Village chairperson and the VEO. Village Council have enormous activities/duties, from among them are as follows;

i. To ensure peace and harmony within the Village
ii. To ensure that community members participate into different development activities
iii. To ensure availability of different social services within the Village such as Education, water, Health services and Roads
iv. Formulation and implementation of different plans and projects to be executed within the Village
v. Conducting different meeting in the village
vi. Supervision of different projects intervention within the village
vii. Overseer of all activities undertaken by different CBOS and organization within the Village
viii. Emphasizing formulation of different Community Based Organizations
ix. Composing by laws and monitoring its implementation

1.1.7 Cultural Factors

Oldonyowasi Village community is dominated by Maasai tribe, few are Wameru. The main language of the community is “Kimasai” native language but Kiswahili is mostly used because majorities are familiar with it.

1.1.8 Education

Oldonyowas Village has one Primary school. It has one secondary school which is built at a ward level (Oldonyosambu Secondary School). Primary school and

Secondary school education is emphasized in the Village. The Village has kindergarten and Pre- Primary School which helps to keep their children and preparing children before entering standard one respectively.

1.1.9 Institutions in the Village

There are different institution prevailing in Oldonyowas Village; the Village has one Primary school, Arusha Catholic Seminary and Oldonyowas youth center sponsored by Compassion international Tanzania The school accommodated pupils from Standard I to Standard VII with a total number of 312 pupils whereby 162 are boys and 150 are girls. On religion institutions the Village is dominated by Lutheran and Roman Catholic.

1.1.10 Critical Issues and Problems

The main critical issues in Oldonyowas Village are prevalence of income poverty to many households within the majority which affect majority in different ways, HIV/AIDS prevalence which has been a threat to majority within the community. Currently, another critical issue is the presence food insecurity to the community due to poor pro harvest techniques and storage facilities.

1.2 Community Needs Assessment

Community Needs Assessment (CNA) is a process of identifying assets of the community and determining potential concerns that face a particular community in the respective locality. A community needs assessment in depth is a way of gathering information about Community's opinions, needs, challenges, and assets used to determine which project(s) will meet the real needs of the community.

Oldonyowasi Community Needs Assessment (CNA) was conducted adhering on this principle and its essence of conducting it at any community.

1.2.1 Objectives for Community Needs Assessment (CNA)

The intention of the Community Needs Assessment (CNA) exercise was to disclose/unveiling the needs of the community as well as their challenges thereafter find the solutions for some critical identified challenges. Assumptions on any component seem to hinder the execution of the activity to combat the identified challenges were employed.

1.2.1.1 General Objective:

The main aim objective of this community need assessment is to identify the needs and priority of the community and some solutions that can be used to solve the main needs identified by Community members themselves.

1.2.1.2 Specific Objectives:

Basically the community Needs Assessment intends to fulfill the following specific objectives;

i. To describe the demographics of the respondents in the CAN
ii. To assess the contribution of food crops production to total household income at Oldonyowas village.
iii. To examine food security status at Oldonyowas Village
iv. To assess perception of the community on merits and demerits of food crops production at Oldonyowas village

1.2.2 Research Questions:

The research questions and the question in the questionnaire were set to fulfill the envisaged target of improving the household food insecurity reduction which in turn will contribute the livelihood of the people in question. The household food insecurity reduction focused on promoting together with other food storage facilities. Other areas concentrated were; accessibility of essential human needsincome poverty and accessibility of Health services.

Another component taken into consideration in the CNA was the employment status/distribution to the Oldonyowas Village community members. The study questions in which the questionnaire was depicted were as follows;

i. What is the location and makeup of the Oldonyowasi Community?
ii. What kind of crops cultivated in your community?
iii. Do your family members access food throughout the year?
iv. How many meals do your family gets a day?
v. Is there healthy and sustainable food production in your community?
vi. What kind of crops do you mostly prefer to cultivate?
vii. Which type of method are you using to store crops?
viii. What traditional methods do you use to protect your crops during storage?
ix. Does crops production have anything to contribute in your income earning?
x. What are the problems associated with crops farming?

1.2.3 CNA Research Methodology

The CNA area was in Arusha District in Oldonyowas ward. The area selected because it is one among the areas which have responded positively the Arusha District campaign on food security as one among the challenge of the district in

which food security will help the Arusha community to improve livelihood hence help to reduce household income poverty to majority. Some of the community members have been involve on silos construction for more than 5 years since they commenced to the time of the CNA.

1.2.3.1 Research Design

Provided the nature of the study was explanatory study, therefore, the cross sectional design was adapted as the ideal design. The reason behind this selection was that, the design allow and helped the researcher to collect various data at single point in time and data collected at once from various respondents (Jamal, 2008). Apart from been economic way for the researcher it also evaded the tediousness approach to the respondents because they responded once for all.

1.2.3.1.1 Types and Source of Data

Both qualitative and quantitative data collected in which both secondary and primary data collected from relevant sources. Primary data collected directly from the farmers and crops traders.

1.2.3.1.2 Sampling Frame

The sampling frame was a total number of households in Oldonyowas Village focusing on the household' sfood production. The total number of people who were involved in food crops production and storage in different categories was 49. Therefore, the sampling frame under this study was 49 households.

1.2.3.1.3 Sampling Unit

The sampling unit in this study was the individual head of household. Key informants included were District Agricultural and Livestock officer, WEO and VEO. The sample size (key informants inclusive) selected and interviewed was 49.

1.2.3.2 Sampling Techniques

The probability sampling (simple random sampling and systematic sampling) was used in selection of the respondents, whereby it facilitates the researcher not to be biased when selecting the respondents at household level. However non probability sampling (Purposive sampling) was also used to select key informants.

1.2.3.3 Data Collection Methods

In this study both secondary and primary data collected. Distinction made in data collection methods and tools between secondary and primary data.

1.2.3.3.1 Secondary Data

These are readily available data/information in the particular/ intended office. These data collected through documentary review method, in which, the abstract from different reports, books, pamphlets, and Journals executed.

1.2.3.3.2 Primary Data

These are the data collected by the researcher directly from the respondents be selected through the determined sampling procedures. Interviews guided by the tested questionnaires have been used in soliciting and collecting primary data. The following methods and tools used in the exercise;

1.2.3.3.2.1 Interview Method

This method effectively used in primary data collection. The researcher solicited the in-depth data/information from the respective respondents by using questionnaire as a main tool. Semi-structured and unstructured questionnaires used in extracting data from the respondents through series of designed questions. The tool was useful in collecting data from the respective officers at the District, ward, and village level as well as to the household respondents.

1.2.3.3.2.2 Focus Group Discussion

This method was very useful in collecting data/Information by using small groups of 9 participants. All groups were involved in the exercise (women and youths in particular). Under FGD participants get chance to discuss on various issues pertaining in their villages and strategies to overcome income poverty in their community. Discussion facilitated by the researcher by using arranged checklist/guiding questions which facilitated the research to arrange and conduct the discussion in logical order. However, FGDs helped in verifying (triangulation process) data/information collected from other methods.

1.2.3.3.2.3 Observation Methods

Under this method, the primary data collected by looking or observing physically on the phenomena under study. In this case, fields, planted apple fruit tree, apples nurseries, and physical development activities prevailing in the specific locality observed and photographed.

1.2.3.4 Data analysis Methods

Data collected was manually edited and coded prior to be entered into SPSS for analysis. Having edited data processed and analyzed by computer using SPSS 16

software. Under analysis; descriptive statistics, frequencies, and correlation computed.

1.3 Community Needs Assessment Findings

1.3.1 Description of the Oldonyowasi Community

The findings which are discussed under this chapter have based on the respondents interviewed. The CNA at Oldonyowasi Village involved 49 respondents who were involved in crops production. Distribution of respondents in different components is as follows;

1.3.1.1. Distribution of Respondents

Table 1 above, indicates that 65.4% of the respondents aged between 31- 40 and 41-50 while those between20-30 have been 10.2% and 51> make 24.5%. This imply that majority of the respondents who engage in crops production are youth hence ensured working force for a considerable long time. On the other hand, female's participation in crops production is low (28.6%) which imply that the activity is mostly done by males. Education wise only 2.0% are tertiary level, 12.4 are secondary level while 81.6 accounts for primary and adult education and 4.1are none educated respondent as it is well indicated in ***Table 1***.This imply that for the level of education the farmers would be slow to adopt new ways of technology. Majority of the respondents were married which also ensure the sustainability to the crops production activity for they are likely to stay at the area for a considerable time.

Table 1 Characteristics of the Respondent

Characteristics	Frequency	%
Sex		
Male	35	71.4
Female	14	28.6
Total	**49**	**100**
Age of the Respondent		
20-30	5	10.2
31-40	16	32.7
41-50	16	32.7
51>	12	24.5
Total	**49**	**100**
Education		
None	2	4.1
Adult education	30	61.2
Primary education	10	20.4
Form four Level	4	8.2
Form Six Level	2	4.2
Tertiary	1	2.0
Total	**49**	**100**
Marital status		
Single	10	20.4
Married	25	51.0
Widower	4	8.2
Divorced	10	20.4
Total	**49**	**100**
Major occupation of respondents		
Peasant	36	86.7
Employed	5	10.2
Business man	3	6.1
Livestock keeping	5	5.2
Total	**49**	**100.0**

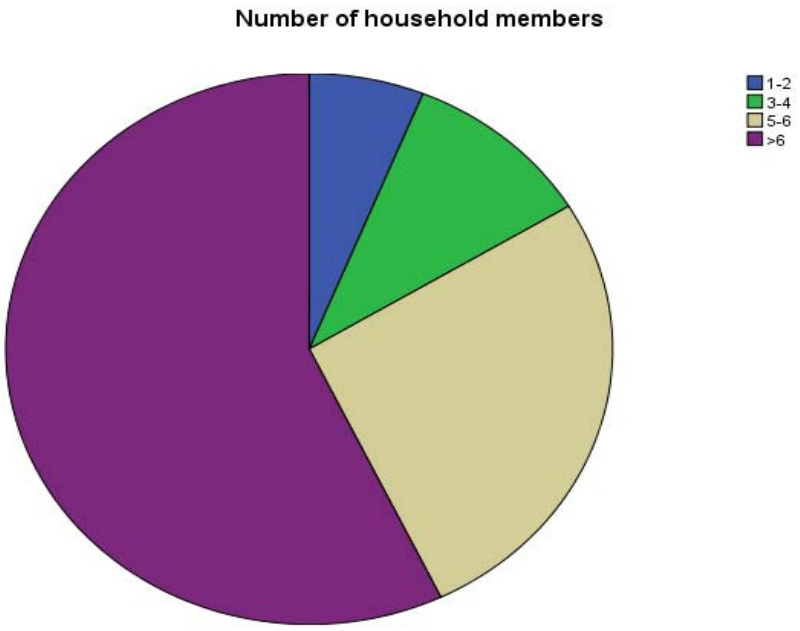
Genders wise majority of the respondents (71.4%) were males as indicated in***Table 1***. This shows that most of the head of households of the intended population were

males. Crops production activity includes both employees and peasants, though employees were at low percentage (10.2%). This implies that the majority of peasant which is 86.7% involves themselves in crops production.

1.3.1.2 Number of people at the household

The interest of knowing average number of the people at one household is to know the burden of caring the member of the household in food access. This then helps to plan on food security and poverty alleviation at household level. According to ***Figure 1*** majority of the households have members more than 6 which are 57.1% of the respondents. The house hold with only 1-2 member is only 6.1% while the household with 5-6 members were 26.5% and household with 3-4 members where 10.2%. The number of respondents revealed the need for sustainable availability of food to suffice the needs of all members in the household.

Figure 1 Number of Person(s) in a Household.

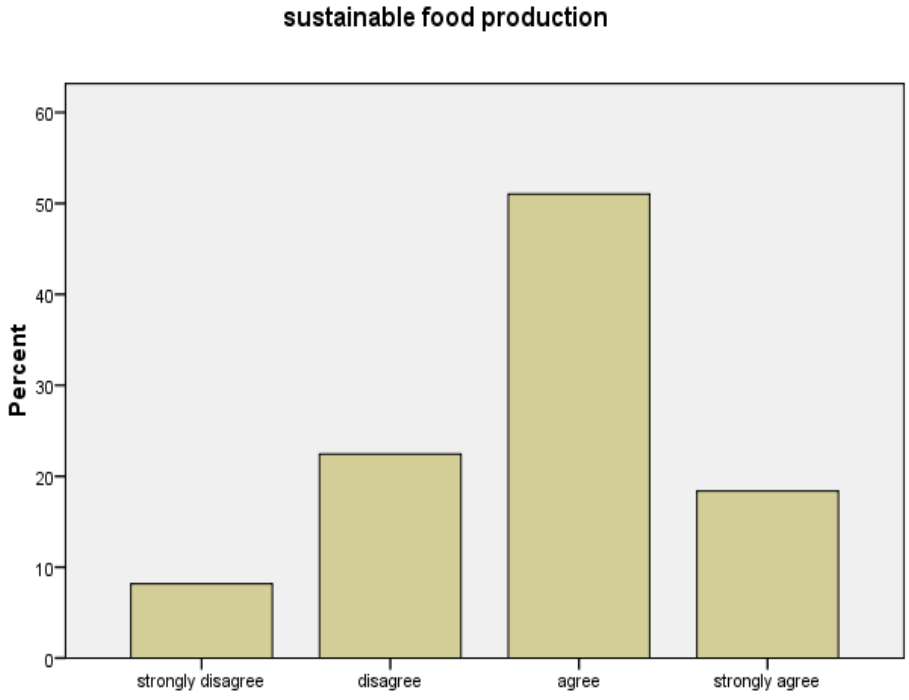


1.3.2 Assessment of contribution of food crops production to the total household income at Oldonyowas village.

1.3.2.1 The practice of healthy and sustainable food crops production in the community

The presence of good geographical condition and seasonal rain make the community practice sustainable food production as***Figure 2 below***shows that, 50.0% of the respondents agree that there is healthy and sustainable food crops production at the community supported by 18% of respondent who strongly agree on sustainable food crops production. On the other hand 22.0% of the respondent disagree the situation of sustainable production while 8.0% strongly disagree that there is no healthy and sustainable food production in the community.

Figure 2 Healthy and sustainable food production.



1.3.2.2 Contribution of food crops production in income earning

According to ***Table 2 below,*** **100%** of the respondentwhich ismajority of farmers say that food crops production has a lot to contribute in their income earning. This implies that food crops production activities is one of the basic and most undertaken by majority in Oldonyowas community.

Table 2 Food crop contribution in income earning.

	Frequency	Percentage	Valid Percentage	Cumulative Percentage
yes	49	100.0	100.0	100.0

1.3.2.3. Earning from Food crops production

Figure 3 below, indicates that 42.0% of the community members at Oldonyosambu Village earned between Tsh. 201,000.00 and 500,000.00. Those who earn above Tsh. 500,000.00 were also 22.0% of food crops producers. In other ways 18.0% earn between Tsh. 50,000-100,000 while 16.0% earn between Tsh.101, 000-200,000. This show that food crops production is likely in contribute income earning at household level for those who engage in it. This income could have been increased if accessible and sustainable food storage could have been ensured. Good plan for food crops production promotion can help to increase income to the community members at Oldonyowas Village.

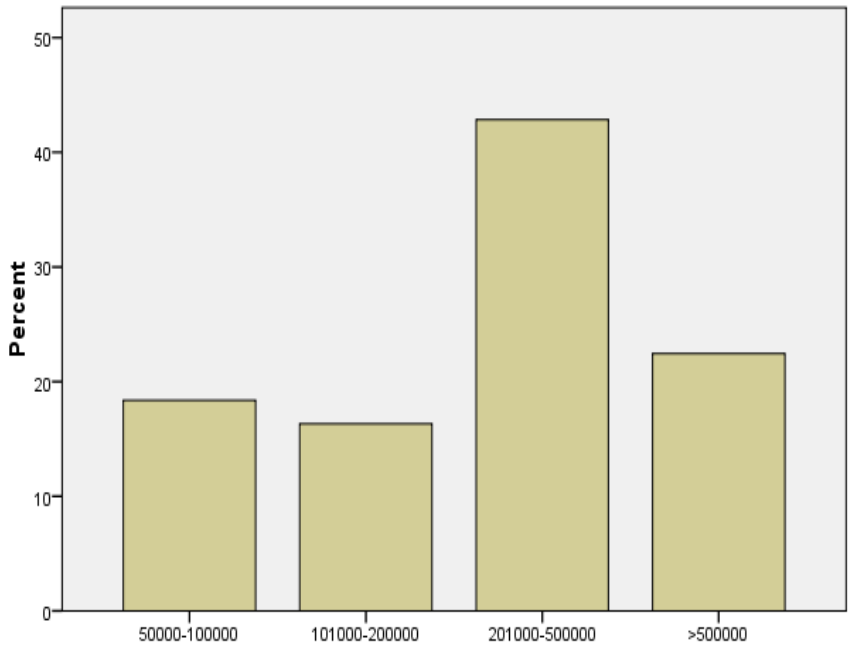


Figure 3 Amount earned from food crop production.

1.3.2.4 Opinion by the respondent on food crops production promotion

The majority of Oldonyowas community members acknowledge that food crops production is useful and ideal activity for income generation at their household. This is justified by 46.9% and 38.8% of the respondents who showed that food crops production is very useful in income earning while only4.1% of the respondent say it's not useful and 10.2 say they don't know.***Figure4below*** shows the respondent's opinion on food crops potentials. These attitudes therefore pave the way for food crops production promotion in the Village. The usefulness of food crops in the community is on income generation and food for their good health. It is therefore the task of Arusha District Council in collaboration with other stakeholders to look on the useful way to promote food crops production.

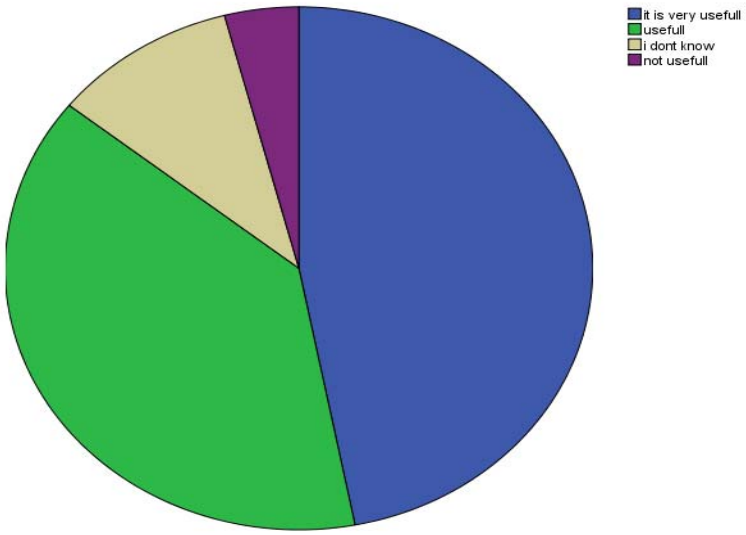


Figure 4 Opinion on the potential of food crop production

1.3.3 To examine food security status at Oldonyowas Village

1.3.3.1 Different kind of crops mostly cultivated at Oldonyowas Village

Oldonyowas community members are engaging into production of food crops such as maize, beans. For the case of food crops in ***Fig5*** the Village engages in maize production which is 61% of the respondent andbeans production is 8.2%while those who cultivate both of the crops is 30.6%. This proves that maize is one among the lucrative crop within the area and it is popular.

Figure 5 Maize production in the village.

1.3.3.2 Food Need Accessibility

Majority of the respondents claimed that "they were not able to access food throughout the year at their household's level" (81.6%), while only 18.4% were accessing their basic needs as it is indicated in ***Table 3 below*** This implies that majority of Oldonyowas Village communities were not accessing food throughout the year according to their economic status prevailing at their area.

Despite engaging into different activities such crop production still they were facing the problem of inadequate resources to meet their food demand.

Table 3 Food accessibility throughout the year.

	Frequency	Percentage	Valid Percentage	Cumulative Percentage
Yes	9	18.4	18.4	18.4
No	40	81.6	81.6	100.0
Total	49	98.0	100.0	

1.3.3.3 Number of meal per day at household level

Figure6 Show that, 67.3% of the respondent gets only one or two meals per day while only 24.5% get more than 3 (three) meals per day. 4.1% of the respondents get three meals per day which is a standard meal. The information suggests that Oldonyowas population were still in food poverty status. Food poverty is among the waste kind of poverty because it leads a person to starve and loose energy which results to a concerned person not to engage in any productive activity.

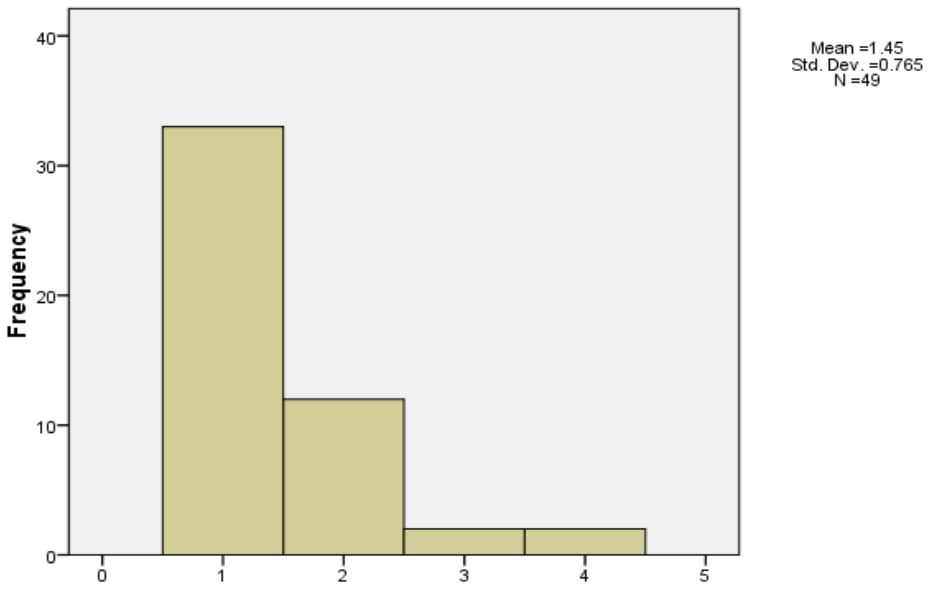


Figure 6 Number of Meals per day at household level.

1.3.3.4 Methods used to store food crops

Food storage is of different categories and types. ***Figure 7*** shows that majority of the respondents (40.8%) are storing their crops by drying while 40.8 does not store their crops and 18.4% of the respondent use fiber sacks. This show that majority of the community at Oldonyowas Village were not aware on the best way of storing their

crops. This then calls for the need to establish different storage technology which will help the community members to have enough food hence food insecurity at household level reduced.

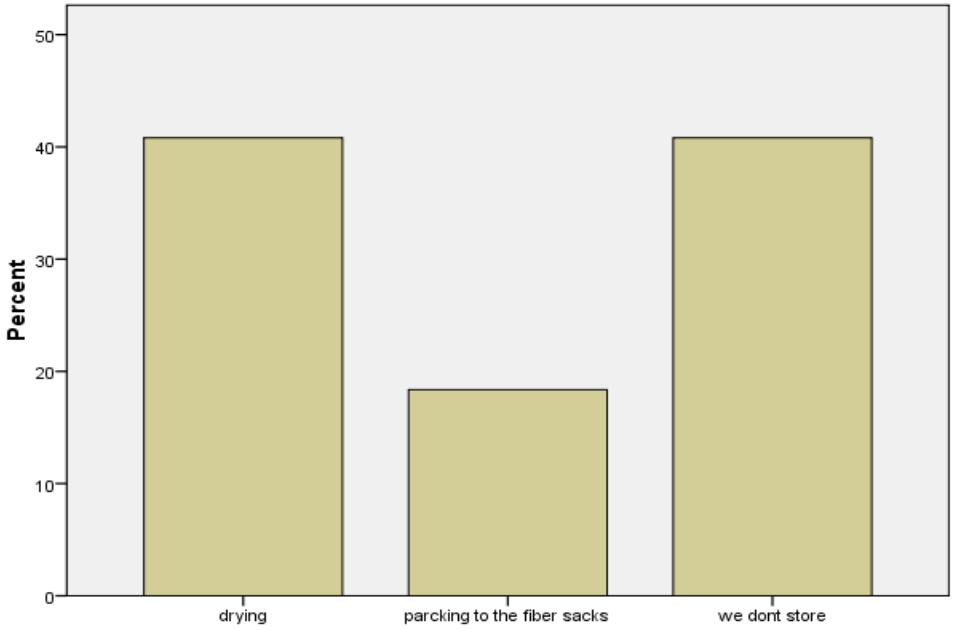


Figure 7 Crop storage method(s) at household level.

1.3.4 Examine perception of the community on merits and demerits of food crops production.

1.3.4.1.1 Perception on engaging in food crops production

Under the community perception on food crops production, majority of the respondents engage in the activity (75.5%). ***Table 4*** shows the perception of the community in engaging in food crops production. This reflects that the Oldonyowas community members are willing and ready to promote food production. By using this perception analysis food crops production seems to be among the lucrative crops within the community members.

Table 4 Majority Engagement in Food Crop Production.

	Frequency	Percentage	Valid Percentage	Cumulative Percentage
strongly disagree	5	10.2	10.2	10.2
disagree	7	14.3	14.3	24.5
agree	9	18.4	18.4	42.9
strongly agree	28	57.1	57.1	100.0
Total	49	100.0	100.0	

1.3.4.1.2 Lack of Remarkable Market

Lack of remarkable crops market hinders the efforts by individuals in crops production. 69.4% of the respondents accepted that this have been their main impediment in crops production as evidenced by information on ***Table 5***. This then justifies that majority population does not engage in crops production due to market uncertainty immediately after harvesting which exacerbate poverty among the Oldonyosambu Village dwellers.

Table 5 Lack of remarkable market for Apples production.

	Frequency	Percentage	Valid Percentage	Cumulative Percentage
disagree	34	69.4	69.4	69.4
agree	15	30.6	30.6	100.0
Total	49	100.0	100.0	

1.3.4.1.3 Lack of Silos grain storage

In order for the activity to attract majority to come in its execution, market assurance of the product itself is of profound importance. Due to the fact that not all produced crops by the Oldonyowas community members have sold timely, majority tends to store their crops waiting for the best price for their product. One of the alternatives was the Silos grain Storage to rescue their unsold food crops. 91.8% of the respondents claimed that lack of Silos grain Storage within their area has led majority to opt on selling their product immediately after harvesting rather than storing them waiting for reasonable price which does not ensure the sustainability of the activity. ***Table 6below***shows percentage from the responses.

Table 6 Lack of Silos led Farmers to sell their products immediately after harvest.

	Frequency	Percentage	Valid Percentage	Cumulative Percentage
strongly disagree	2	4.1	4.1	4.1
disagree	2	4.1	4.1	8.2
agree	8	16.3	16.3	24.5
strongly agree	37	75.5	75.5	100.0
Total	49	100.0	100.0	

1.3.4.2 Problems associated with food crops farming

According to Table 7, majority of the respondent argued that lack of storage facility is the most problem hindering development of food crops production which makes

46.9% of the respondent while 24.5% of the respondent says low price of the crops product is a problem. Others are 12.2% who says inaccessibility of market during rainy season and 16.3% who says lack of market is the most problem in food crops farming.

Table 7 Problems associated with food crop farming.

	Frequency	Percentage	Valid Percentage	Cumulative Percentage
Inaccessibility of market during rain	6	12.2	12.2	12.2
lack of market	8	16.3	16.3	28.6
low price	12	24.5	24.5	53.1
storage facility	23	46.9	46.9	100.0
Total	49	100.0	100.0	

1.3.4.3 Opinion by the respondent on promotion of food crops production

Most of the respondents showed their concern on construction of silos grain storage as the way to promote crops farming. 67.3% of the respondents aired out their opinion that construction of silos grain storage can help them to promote food crops production. This is due to the fact that those grains used to be rotten will be rescued by stored in a very best way. While 32.7% of the respondent argue that promotion of crops production will be only promoted through expanding market. ***Figure 8below*** shows the respondents' opinion on the promotion of crops production.

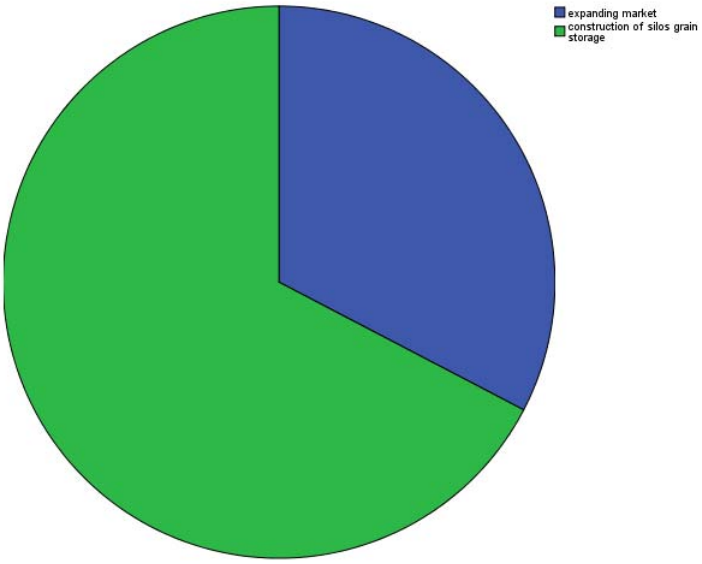


Figure 8 Opinion by Respondents on promotion of food crop production.

1.4 Community Needs Prioritization

1.4.1 Community Needs Analysis

In the community needs assessment exercise, the Oldonyowas community came up with various needs which if fulfilled would be in favorable environment in their effort to combat the worse enemy, Food poverty for their suitable livelihood. However, due to the resources constraints which outweighed the available needs, the community had to undergo prioritization exercise so as to come up with a reasonable decision on what to implement first. This important step was done in Focus Group Discussion**.** The exercise was conducted by using the Pair wise Ranking Matrix techniques as it is shown in **Table 8.**

Table 8 Community Needs pair wise Comparison chart.

NEEDS	Credit facilities for agriculture	Agriculture Input	Construction of Silos	Maintenance of road	Market Establishment	Total Points	Ranking
Credit facilities for agriculture		Credit facilities for agriculture	Construction of Silos	Maintenance of road	Credit facilities for agriculture	**2**	**4**
Agriculture Input	Credit facilities for agriculture		Construction of Silos	Maintenance of road	Agricultural Input	**1**	**3**
Construction of Silos	Construction of Silos	Construction of silos		Construction of Silos	Construction of Silos	**4**	**1**
Maintenance of road	Maintenance of road	Maintenance of road	Construction of Silos		Maintenance of road	**3**	**2**
Market Establishment	Credit facilities for agriculture	Agricultural Input	Construction of Silos	Maintenance of road		**0**	**5**

Table 8 shows the leveling of the needs facilitated by the Pair wise Matrix. The total needs unveiled was 5 which were as follows;

i. Credit facility for agriculture
ii. Agriculture input
iii. Construction of Silos
iv Maintenance of road
v Market Establishment

Under the needs prioritization exercise, construction of silos grain storage ranked number one while market establishment ranked number five. This indicate that the first need by the Oldonyowas community were Construction of silos grain storage.

1.5 Conclusion

The struggle on food poverty reduction in Tanzania needs multidisciplinary approach due to the fact that food poverty has a multifaceted approach which calls for multidimensional approaches. Different approached have been used to cub the problem of food crisis within the communities. Provided food insecurity has said to be rural phenomena, regardless rural area is where food is produced.

The conducted CAN has revealed that food insecurity within the community has just contributed by lack of applied technology silos is one of them and also the government role to promote farmers on production incentive .

The CNA has finally come up with various needs to be addressed by preparing different projects. However, the needs leveling process have simplified the chronological and logical order on how to address those needs. Therefore the end of this CNA calls for further steps to be undertaken for the exercise not to be in vain.

CHAPTER TWO

20 PROBLEM IDENTIFICATION

2.1 Background of Research Problem

Food insecurity is a multidimensional phenomenon. A food secure household is certain of its economic and physical means to access adequate food and consume a nutritious diet. Food insecurity for a long time has said to be rural phenomena whereby majorities are engaging in subsistence farming. Due to this fact agricultural diversification is the only possible way to address the problem. Tanzania has engaged itself into effective participatory approach in its different planning process to involve local communities on the war against food insecurity. Community participation in development planning has been the contemporary approach to ensure that community participates in struggling pulling out from food insecurity as envisaged by the National Development Vision 2025 (URT, 2000).

Participatory assessment approach was used to identify problems affecting Oldonyowas Village. This has been the useful tool which in turn resulted into identification of problems thereafter plan for their immediate solutions to rescue the prevailing situation which has been an impediment and hindrance to the community striving pooling themselves out of food insecurity.

The study revealed that the Oldonyowasi Village Communities still trapped into food insecurity which prohibits them from living decent life. Oldonyowasi communities have been using various ways of storing food from agriculture product. From among farming products produced, grain production has been conducted within the Village.

The study has unveiled different opportunities prevails within the community, among others are; availability and accessibility of suitable land for crops production in Oldonyowasi Village and many other areas (about ¾ of land in Arusha is suitable for grains crops production), one market situated near Village (Oldonyosambu market) is a potential market for the products produced at Oldonyowasi Village.

The review of the history of food security begins where and when “Food Security” starts to be a concern at worldwide level rather than at a country, province, village or household level only. During the 1930’s, and following world war one, world affairs were being dealt with by the League of Nations. In his “World Food Security”, John Shaw reports the Sir John Boyd Orr writings regarding what may be considered as the origin of modern food Security. “In the early 1930’s Yugoslavia as the member of League of Nation proposed that in view of the important of food for health, the health division of the League of Nation should disseminate information about food position in representative countries of the world. Its report was the first introduction to the world food problem into the international political arena”. (D John Shaw, 2007). Altogether, food security being by essence multidisciplinary there are no difficulties to include nutrition within the food security problematic and at least in development perspective, It would make limited sense to separate nutrition from the other discipline that contribute to the analyzing food security.

The problem identification at Oldonyowasi Village based on the Community Needs Assessment which came up with a number of problems and ranked according to their importance to the community. The Community Needs Assessment exercise resulted into identification of different problems pertaining at Oldonyowasi Village. The main problem is the prevalence of food insecurity within the community members.

Identified problems concerning food security as one of the strategy towards food insecurity alleviation, these are inaccessibility to fertilizer used in farming is a constrain which impede majority to engage in farming and or to undergo effective grains crops production, another problem is inadequate knowledge on seedlings, lack of silos grain storage has exacerbated majority not to engage into grain crops production. Silos grain storage facility could have been rescued the rotten grains due to lack of market and increase the community's income for the community not selling their crops immediately after harvesting due to lack of storage means but also maintain food availability in the household level. Another problem uncounted is markets and Infrastructure, limited access to agriculture-related technical assistance.

Lack of knowledge on how to use silos grain storage is another great problem to the community members. Grain storage is another useful alternative to propagate crops market but despite of lack of Silos grain storage majority are faced with the problem of technical know-how on the use of Silos grain storage. Feeder roads for crops transportation is of great importance because without good roads crop product cannot be easily transported. Therefore the problem of bad feeder roads aggravates poor crops production.

Having discussed with the community and ranked the problems by using pair wise matrix techniques the identified core problem was lack of silos grain storage. The profound of this problem is due to the majority of farmers to be discouraged farming more grain crops due to unreliable market of their product and depending one sided market channel. With silos grain storage farmers will then be able to have enough food throughout the year, and then selling not only during harvesting period where

price is low but even after long time. This will increase the community food security hence ensure food sustainability.

2.2 Problem Statement

Poverty and food security have profound implications for health and welfare, Results from different research studies demonstrate that farmers lose up to 40% of the harvest through ways of store their product. This has a negative impact on their income, livelihood and production incentives, low price immediately after harvesting due to lack of storage technology within the production area. Oldonyowas people have struggled to pull out of Food insecurity but still they are trapped in food crisis wheel. Different studies undertaken at Oldonyowas Village including; Community participation in identifying different opportunities and planning for development (O&OD) conducted in 2002 throughout the District (URT, 2000). Two other studies conducted by Journal stored product research in 2009 to improve food security in Arusha District (Tadele and Gitonga, 2011).

However, the studies did not solve the problem. The current study came up with the detailed study which unveils the opportunities for viable and reliable crops production with the focus of contributing in sustainable food security. The silos grain storage project therefore, is there to bridge the gap to ensure food availability and accessibility for sustainable food security in Oldonyowas and Arusha as a whole. Currently, DADPS has conducted studies and established awareness in different areas to increase communities' paces towards different technology in food storage including silos grain storage (ADC, 2013).

2.3 Project Description

The targeted community in the project is Oldonyowas Village community which is one among 54 Villages of Arusha District.

Majority of the people in the village are poor due to the small scale farming which is mostly practiced in the area and in most cases it is subsistence farming. During harvesting season the farmers are forced to sell their crops immediately due to lack of storage facility. For those who don't sell their crops on this particular period where there is heavy rain, this tends result to many crops to be rotten and majority to incur loss.

The project will be executed by the each household of crops producers under the general supervision of the Village council. Project activities arranged to start on November but the Host organization accepted to commence the business on December and complete the project on May, 2015.

Arusha District Council as the great stakeholder has promised to support the project by providing all necessary equipment and training necessary to run the project while each household will provide work force and amount of 50,000/= for the project.

2.3.1 Target Community

The target community is the small farmers in Oldonyowasi Village. Under this study it has been unveiled that in order for the crops production to be promoted, small farmers are to be facilitated to access reasonable market and enabled to acquire skills on storing crops. Silos grain storage project is therefore to cater the problem of unsustainable food security.

The Silos grain storage project concur the Arusha district effort to fight food insecurity within the District. The establishment of simple silos grain storage will expand crops production and influence majority to engage in crop production activities hence agriculture promoted. The project will run by the household crops producers, successful implementation of the project will help different institutions and organizations to learn.

2.3.2. Stakeholders

Different stakeholders will contribute in the implementation of the project. The main stakeholder is the Arusha District Council (DPLO, DALDO,) who will facilitate on construction of Silos grain Storage, and the necessary training to operate the project. Other stakeholders include; Oldonyowas Village Council who is the owner and the executer of the Silos grain Storage project. Oldonyosambu market and Oldonyowas Village Community who will be the consumer of the Silos grain Storage project products.

2.3.3 The Project Goal

The project goal is to improve food security status of the community members by household food crisis reduction among the peasants for their decent life. Establishment of silos grain storage at Oldonyowas Village will help to rescue a certain amount of grains used to rote due to local ways of storing crops.

Good price of crops products will in turn encourage majority of the community members to engage into crops production hence, increased production.

2.3.4 Project Objectives

2.3.4.1General Objective

The general objective of the project is household food insecurity reduction through construction of silos grain storage by June 2015.

2.3.4.2 Specific Objectives

Specifically the project intend to;

i) Sensitizing the Oldonyowas community members on silos grain storage project by August 2014
ii) Facilitating on building skills and knowledge on managing silos grain storage project bySeptember 2014
iii) To assist in raising fund for successes full intervention on the silos grain storage project by November 2014
iv) To create reliable market for grain's by February 2015

2.4 Host Organization/CBO Profile

The host organization is Oldonyowas Village Council. The Village is in Oldonyosambu Ward in Arusha District. The Village Council is led by Village Chairperson and the Village Executive Officer. In order to run the project steering committee is made up with the group leaders with the three selected members to make five members of the steering committee.

2.4.1 Host Organization Leadership

The leaders of the host organization are; Village Chairperson, Village Executive Officer, and Treasurer. Under the Village leaders there are group leaders who are

working in collaboration with Village leaders, specifically for the construction project.

2.4.2 Vision of the Host Organization:

Being exemplary in facilitating the community members in changing their mindset and enhance socioeconomic development.

2.4.3 Mission of the Host Organization

Oldonyowas Village Council intends to become a model organization in provision of socio economic services to the community members so as to ensure decent life to her people and living in peace and harmony.

2.4.4 The Roles of CED Student in the Project

The main role of CED student's is to ensure that the planned interventions are successful implemented as per plan. To fulfill this the following activities undertaken;

i. To sensitize Oldonyowas community members on the importance of fruits processing project.

ii. To consult different stakeholders to access resources needed for the project implementation

iii. To facilitate the purchase/access of project tools and equipment for project implementation

iv. To facilitate training to Oldonyowas Village and group leaders on managing and operating the processing project.

v. To facilitate market reliability in collaboration with Village and District officers.

vi. To facilitate and ensure participatory Monitoring and Evaluation process of the project.

2.4.5 The Roles of the Host Organization

i. To attend all required training.

ii. To participate in the community sensitization on the project

iii. To participate in the project product marketing

iv. To ensure safe guard of all the project tools and equipment

v. In collaboration with the MCED students to consult different stakeholders for fund to run the project

vi. To participate in the process of the project tool/equipment procurement.

vii. To sensitize fruits producers to bring at the processing center timely

viii. To ensure administrative activities throughout the project life.

ix. To ensure the progress report is provided at every interval it needed

x. To ensure the project sustainability.

CHAPTER THREE

3.0 LITERATURE REVIEW

3.1 Introduction

Under this chapter different authors who embarked on issues related food security and storage and on poverty reduction endeavor have been reviewed. Report's findings on food security, and different projects related to food security have been reviewed. However, different policies on agricultural development in Tanzania have also been reviewed. The chapter contains theoretical and empirical literature review, policy review as well as the literature review summary. These parts intend to narrate on food security, depict what have been done with others so far, and analyze different policies affect the project respectively.

3.2 Theoretical Literature

3.2.1 The concept of food security and its classification

Food Security" is one of major elements of development and poverty alleviation and has been the goal of many international and national public organizations. The issue is so important that according to the state of food insecurity in the world 2012 published by FAO around 870 million people (out of which 852 million from developing countries) are estimated to have been undernourished in the period 2010-12. Although the phrase "Food Security" is being used widely, the definition and concept of food security is elusive and being evolved and expanded over time. Each country in the world is striving to get food security to her people. Food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life" (World Food Summit, 1996).

"Community food security exists when all citizens obtain a safe, personally acceptable, nutritious diet through a sustainable food system that maximizes healthy choices, community self-reliance and equal access for everyone. Public Health Association of British Columbia (PHABC).

From these definitions, achieving food security seems utopian (at least ideal) and no country could hope to reach in reality. Therefore, for specific program/project or particular nation definition of food security should be something achievable or measurable at least for certain duration. But, these definitions should cover the basics. No matter how we define food security, having enough to eat regularly for active and healthy life is the most essential human need. Many developing countries, especially in South Asia and Africa, haven't been able to fulfill this vital need even today.

3.2.1.1 Food Security theory

Food security at global or national level may not usually address the household level food security problem. The relationship between national food security and household food security is less prominent in developing countries than in developed ones. Therefore, specific policies are required to address household level food insecurity and these policies should be contextual and problem specific (Hamelin et. al, 1999).

Finding ways to improve the effectiveness and impact of food security interventions is one of the key challenges facing the development assistance community. Interventions have an uneven record of success and worryingly, high rates of food insecurity remain in many parts of Africa and Asia.

In-part, this uneven record is due to the very nature of food security. There is a growing recognition that food security is a complex systems phenomenon, embedded in social, economic, political and biophysical contexts where many site-specific factors interact to shape food security and where these interactions often lead to unexpected outcomes. It is not surprising that blunt, one-size-fits-all prescriptions of increasing food production and access have achieved little traction. Nor is it surprising that there are a number of different schools of thought on how to precede, including recent additions such as food systems approaches that propose to tackle head-on the systemic nature of the food security challenge. Mixed outcomes from previous food security interventions, combined with an increasing focus on results orientation in development investments, and has led to a rising demand on developing and making explicit the Theory of change or impact pathways underpinning interventions.

3.2.2 Types of food security

3.2.2.1 Chronic Food Insecurity

Lack of minimum requirement of food to the people for a sustained period of time due to extended periods of poverty, lack of assets and inadequate access to productive or financial resources can be called as Chronic Food Insecurity.

3.2.2.2 Acute or Transitory Food Insecurity

Sudden lack of food or reduction in the ability to produce or access minimum requirement of food due to short-term shocks and fluctuations in food availability and food access, including year-to-year variations in domestic food production, food prices and household incomes can be defined as Acute or Transitory Food Insecurity.

3.2.3 Dimensions of Food Security

Food security is the outcome of food system operating efficiently. Efficient food system contributes positively to all dimensions of food security. Following are the dimensions of food security.

3.2.3.1 Food availability

This dimension addresses supply side of the food security and expects sufficient quantities of quality food from domestic agriculture production or import.

This is simple mathematical calculation weather the food available in certain territory/country is enough to feed the total population in that particular territory and calculated from the level of local agriculture production at that territory, stock levels and net import/export.

This dimension of food security at different levels can be assessed by precipitation record, food balance sheet, food market survey, agricultural production planet. Similarly, indicators of food security for this dimension at different levels are fertility rate, food production, population flows, harvesting time, staple food production, food storage, consumption of wild foods etc.

3.2.3.2 Food access

Having sufficient food at national level or at certain territory cannot be taken as the proof that all the household or individuals in the country/territory have enough food to eat. Food access is another dimension of food security which encompasses income, expenditure and buying capacity of households or individuals. Food access addresses whether the households or individuals have enough resources to acquire appropriate quantity of quality foods.

Some of the indicators of this dimension at different levels are food price, wage rate, per capita food consumption, meal frequency, employment rate etc. and the dimension can be assessed by Vulnerability Analysis and mapping (VAM), Food Access Survey, Food Focus Group Discussion, Intra- household food frequency questionnaire etc. Interventions to improve this dimension of food security are inter alia on-farm, off-farm and non-farm employment creation, school-feeding program, breast feeding campaign etc.

3.2.3.3 Food utilization

Food utilization is another dimension of food security which addresses not only how much food the people eat but also what and how they eat. It also covers the food preparation, intra-household food distribution, water and sanitation and health care practices. The nutritional outcome of the food eaten by an individual will be appropriate and optimum only when food is prepared/cooked properly, there is adequate diversity of the diet and proper feeding and caring practices are practiced.

Stunting rate, wasting rate, prevention of diarrheal diseases, latrine usage, weight-for-age, goiter, anemia, night blindness etc. are the indicators at different level for this dimensions which can be assessed by demographic and health survey, immunization chart etc.

3.2.3.4 Stability

This dimension addresses the stability of the other three dimensions over time. People cannot be considered food secure until they feel so and they do not feel food secure until there is stability of availability, accessibility and proper utilization condition. Instability of market price of staple food and inadequate risk baring

capacity of the people in the case of adverse condition (e.g. natural disaster, unexpected weather etc.), political instability and unemployment are the major factors affecting stability of the dimensions of food security.

This dimension of food security can be assessed by Global Information Early Warning System, Anthropometric survey, weighing chart of pregnant women against certain indicators like food price fluctuation, women etc. against certain indicators like food price fluctuation, women's BMI, pre-harvest food practice, migration etc. Interventions to address this dimension are saving and loan policy, inter-household food exchange, grain bank, food storage etc.

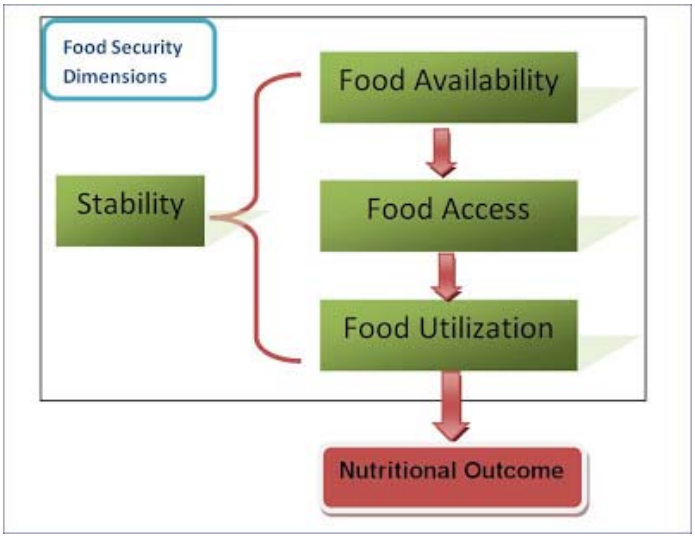


Figure 9 Dimension of food security.

3.2.3.5 Food security status in the World and in Tanzania

According to (FAO, 2006),The latest estimates indicate that 805 million people about one in nine of the world's population were chronically undernourished in 2012–14, with insufficient food for an active and healthy life. This number represents a decline of more than 100 million people over the last decade and of 209 million since 1990–

92. The vast majority of hungry people live in developing regions, which saw a 42 per cent reduction in the prevalence of undernourished people between 1990–92 and 2012–14. Despite this progress, about one in eight people, or 13.5 per cent of the overall population, remain chronically undernourished in these regions, down from 23.4 per cent in 1990–92. According (URT 2007), the rate of Food insecurity in Tanzania is still high. The base of the statistics is the House Budget Survey (HBs) of 1991/92 and 2000/2001 which have been adjusted over time. These surveys show that over 36% of Tanzanians were living under food poverty. URT (2008) shows that the population bellow the basic needs poverty experienced low reduction since 2000/2001 to 2008 (39% to 33.64%). Such situation hinder most of Tanzanians to live decent life by being prohibited access to basic necessities such as food, and other services like access to health.

3.2.4 Global effort to combat food insecurity

Reducing hunger will set off a positive ripple effect across people's lives, communities, countries even continents. This cannot be accomplished by short term interventions; it requires addressing the underlying causes of chronic hunger. Advancing agriculture led growth helps rural farmers who are the majority of the world's food insecure population to grow more food to feed their families and sell more of their products in commercial markets. Increased revenue generates greater income to buy more to meet their needs, allowing the poor to pull themselves out of poverty.

In 2003, African leaders made a historic pledge to increase their own investments in food security and agriculture-led growth through the Comprehensive Africa Agriculture Development Program (CAADP). Since then, dozens of countries in

Africa and beyond have been developing comprehensive agriculture development strategies. There is also increasing engagement by foundations, non-governmental organizations, and the private sector. The United Nations High Level Task Force on Food Security is leveraging the combined strength of a number of UN organizations and Bretton Woods institutions. And in 2009, at the L'Aquila G8 Summit, donors committed more than $20 billion to support a renewed global effort. The summit not only catalyzed new financial commitments; it also brought a commitment for a new approach.

3.2.4.1 Food crops production worldwide and in Tanzania

The world food production has increased substantially in the past century, as has calorie intake per capita. However, in spite of a decrease in the proportion of undernourished people, the absolute number has in fact increased during the current food crisis, to over 963 million. By 2050, population growth by an estimated 3 billion more people will increase food demand. Agriculture continues to be the backbone of the Tanzanian economy. More than 80% of the economically active population is engaged in food production. Agriculture constitutes the country's principal source of income, providing about 50% of its GDP and more than 90% of its export earnings. Since independence, the Tanzanian government has sought to encourage fundamental changes in the traditional structure of rural production through a series of economic and social policies. Traditionally, Tanzanian agriculture was carried out through small-scale cultivation by dispersed family units. This pattern not only characterized subsistence farming but the cash crop sector as well. After the Arusha Declaration, the government initiated its Ujamaa Village Program, which sought to transform agricultural production into communal undertakings

carried out by rural inhabitants who had been regrouped into villages. Subsistence crops include maize, which is grown by more than 50% of Tanzania's farmers.

3.2.5 Food security status in Tanzania

In 2010-11, around 730,000 households (or 8.3% of all households) in Tanzania were classified as having poor dietary intake. This represents a slight drop from 9.8 % in 2008 - 09. This shows the prevalence of households with poor dietary intake between the two years.

The severity of food insecurity is considered highest for those households classified as having PDI in both phases of the survey (i.e. 2008-09 and 2010-11).This group is described as having chronic PDI and during the reported periods experienced a protracted duration of food insecurity. Around 150,000 households (or 1.7%of the total) suffered from chronic PDI. The zones with the highest rates of chronic food insecurity were Central (4.9%), Zanzibar (4.5%) and Lake (3.8%).

3.2.6 Regional food Production in Tanzania

Desegregation of food production data at regional level shows that a number of regions are food deficient. The least food sufficient but not necessarily the most food insecure region is Dar-es-Salaam which produces only about 5 per cent of its food requirements.

There are also large regional variations in production and although 1988-89 was acknowledged as a bumper harvest year at the national level; about 40 per cent of the population lived in food deficit regions; another 20 per cent just reached a tight balance; leaving only 40 per cent who could be described as self-sufficient from own

production. This means that production was concentrated in a few regions and because of severe problems of transportation and communication internal distribution systems are severely constrained, putting the food deficit regions at great risk of food insecurity. The problem is compounded by the geographical distribution of production areas which are remote from the main consumer markets; particularly Dar-es-Salaam the most food deficit region. It should be noted that even in some of the food sufficient regions pockets of food deficits sometimes occur in certain districts or parts of those districts because of drought or floods.

A most striking feature about available information relating per capita food production, regional wealth and malnutrition rates is that the latter does not directly correlate with the former. All the food (mainly maize) surplus areas have higher malnutrition rates than the food deficit areas. Several studies suggest that about a third of the rural population would have to rely on cash income to purchase their food needs either entirely or to supplement their agricultural output.

3.2.6.1 The environment and food security

The environment can be viewed as an interlinked network of systems with very complex relationships. For example increased use of wood fuel or the expansion of land area for cultivation or for grazing often times results in deforestation and land degradation. climate change and possible desertification which adversely impact food security. It is possible to classify Tanzania into seven agricultural production/consumption systems (Bryceson et al, 1986) which further assists in differentiating between the problems and causes of household food insecurity. The areas which seem to have the greatest food deficit problems are the pastoralist and the millet/sorghum/ livestock production systems with the latter having the most

severe problems. When the system was designed in 1986 the food deficit areas accounted for about 47 per cent of the mainland population. The paradox, however, is that many of these food deficit areas have lower malnutrition rates than the food surplus areas.

The food deficit areas coincide with the drought/flood prone areas. While in Tanzania drought is a fact of life in some areas; in the past 30 years serious droughts have occurred in 1961/62, 1974/75 and 1984/85. Some areas in eleven out of the 20 regions of mainland are generally considered drought prone and, therefore, at greatest risk of food insecurity. These regions are:- Mara, Mwanza, Shinyanga, Kigoma, Tabora, Singida, Arusha, Kilimanjaro, Tanga, Dodoma and Mtwara. Dodoma is the traditional famine prone region. However, these drought prone regions also nearly always include highly productive areas where crop failure never occurs. This is to be expected, when the vastness and physical diversity of Tanzania is considered. This makes it highly unlikely for the country as a whole to experience total crop failure. It seems that if intra- and inter-regional food commodity transfers were properly managed and a proper infrastructure lay down, the country on its own could manage very well to alleviate the worst effects of drought in all but the most unusual years. As a drought measure the Government has proposed a pattern of regional specialization of food crop production to match with the agro-climatic zones.

3.2.7 Challenges facing food crops production in Tanzania

High reliance on labour intensive farming tools severely limits the amount of land that can be cultivated, which, in turn, limits yields. The higher costs of mechanized equipment, and associated costs of maintenance and importing machine

components, combined with a lack of servicing centres across the country, renders ownership, and even renting such equipment outside the realm of most farmers. In 2010 - 11, over 95% of rural households were still using hand hoes, making it the country's main cultivation tool. Farmers were far more likely to either own or rent an ox-drawn plough (9% and 18% respectively) than a mechanized tractor plough (0.2% and 2.8% respectively) (NBS, 2012).

Use of agricultural inputs such as fertilizer and improved seed varieties is rare in Tanzania. In 2010-11, less than a third (32%)of farmers used fertilizer 21% used organic fertilizers and 16.5% inorganic (NBS, 2012). Over the same period, only 17% of farmers sowed improved variety (IV) seeds, which are designed to enable crops to grow in adverse conditions –such as drought and pesticide/herbicide sprayings. If farmers used IV seeds in combination with inorganic fertilizer, they might expect to see higher productivity from their plots. For instance, when IV seeds and inorganic fertilizers were used for maize plots, average yields were 115% higher than plots without improved inputs (before controlling for other factors such as plot size and farmer education) (EPAR, 2012). These agricultural inputs remain largely inaccessible for most smallholder farmers due to cost.

Smallholder farmers lack opportunities to gain new skills and knowledge regarding improved agriculture technologies. Farmer groups and extension services are typical ways farmers can improve their access to technology, funding, crop processing and marketing. Tanzania's largest farmer group (MVIWATA) brings together smallholder farmers from the country's regions; it has approximately 1,000 groups in more than 80 districts. However, the 2010 MDG report identified a lack of qualified extension services and not enough incentives to retain providers (GoT, 2011).

Many smallholder farmers in Tanzania suffer from either pre-harvest or post-harvest crop losses. Overall, 9% reported post-harvest losses in 2010-11 (down from 14% in 2008-09). In 2010-11, one third of farmers stored part of their production with two thirds of them using sacks or open drums. However, only 6% of farmers used methods capable of decreasing post-harvest losses such as modern storage structures and air tight drums. Preharvest losses should also be considered: in 2008-09, on 30% of the country's maize plots, farmers reported harvesting less area than they planted, with more than half attributing the loss to drought. Additionally, pre-harvest losses, which were reported by farmers on 34% of plots, were attributed to wild animals, theft and insects. These joint findings suggest harvests may improve with both better storage facilities and improved varieties of drought and pest resistant seeds.

Lack of access to credit for smallholders is a major barrier to increased productivity and income. If in place, well-established lending and credit systems could enable smallholders to purchase key agricultural inputs such as fertilizer and pesticide. However, formalized financial lenders remain very restricted in Tanzania; indeed, in 2010-11, only 2.2% of farmers reported receiving credit for the purchase of agriculture input.

3.3 Empirical Literature Review

The concept of grain storage dates back to the Medieval England as explained by McCloskey and Nash (1984). The authors explained the economy of grain storage to be a simple kind of insurance that could substitute for scattering. Moreover, there is a correlation between storage cost and the existing interest rate in the grain market because storage is viewed as an investment. Stored grain over a period of time must cover the cost of the shed and security, depreciation of grain as well as the

opportunity cost (rate of 7interest) of funds invested. The authors further explained that, in the medieval ages, storage was neglected. (McCloskey and Nash, 1984). Because “medieval Europe did not know how to store grain or accumulate reserves” (Komlos and Landes, 1991).

Stefano Fenoaltea attempted to illustrate the estimate of carryover grain in dimensions of monastic barns. He estimated that “the monastic barns alone could hold enough grain to feed England’s human population for over a year and half” (McCloskey, 2001).

Komlos and Landes (1991) explained the controversy over the nature of grain storage in medieval Europe that was initiated with a thesis by (McCloskey and Nash, 1984). McCloskey and Nash were challenged by (Fenoaltea1984) who create dan argument about the economics of grain storage. Moreover, according to Komlos and Landes (1991) the concept of grain storage was brought forth by lucid risk-adverse farmers who wanted to insure against inadequate harvest as well as the prevention of starvation. “Fenoaltea suggested a less costly form of self-insurance, namely storage. He argued that grain inventories were, in fact, considerable already in the middle ages, and holding such stores was a less expensive way of insuring against disasters than scattering”(Komlos and Landes, 1991). McClosky and Nash (1984) suggest that grain storage systems were irrelevant in the medieval world because they were costly and the interest rates were too high and the scattering of fields was over storage as a form of insurance. Fenoal tea was unconvinced and further explained “McCloskey and Nash suggest that grain storage was a form of investment; consequently farmers would have kept stocks only to the extent that they were economically warranted. Grain would have been stored if doing so would have covered the cost of the barn

and the guards, the depreciation of the grain, and the opportunity cost of the funds invested"(Jones, Alexander et al., 2011).

Tadele et.al. (2002) conducted large-scale experimentsin maize storage in Kenya. Kenya borders Tanzania and has similar environmental conditions. The authors explainedthat post-harvest losses experienced in Kenya (East Africa) are largely caused by pests such as the weevil Sitopphilus zeamaisand Anagoumois. They further explained that famers in Tanzania, as in Kenya, have been introduced to alternative chemical interventions as the means to help solve pest problems. However, due to economic constraints, the strategies have not been adopted in several East African countries. Misuse of the chemical intervention strategy poses a health hazards for famers and their families. Despite the introduction of the chemical strategy, larger grain borer infestations in rural maize stores are still a problem for small-scale farmers.

Concerning food crops production in Arusha District, very few have done empirically. Most of the efforts have been on sensitization people to engage in crops production but have been done on training and establishing crops production units within the district. For example, the priority of Arusha district council through DAPS in 2013/14 was on food crops production(ADC, 2013). Different crops which are produced in Arusha include; maize, beans, carrot, but most of the crops have been rotting due to unstable market. Grain storage technology is currently an ideal strategy to promote food crops production in Arusha.

The construction of silos grain storage project which is planned to be constructed at Oldonyosambu Village, comply the revised Agriculture and Livestock Policy of

Tanzania of 2008 under the crops production development. The project is also in hand to hand with Millennium Development Goals (MDG) 2015, the *MKUKUTA II* under the section of poverty reduction. MKUKUTA II builds on the predecessor Strategy (MKUKUTA I), it is oriented more towards growth, and enhancement of productivity, with greater alignment of the interventions towards wealth creation as way out of poverty including food (URT, 2010:2) .

It also in line with the Tanzania five years Development plan (2011/12-2015/16) as well as the Nation Development vision 2025, focusing on poverty reduction through agriculture development. However, with Kilimo kwanza, which focus on increasing production and market availability for the products, the planned project is hereby as a driving force towards successful realization of the envisaged food insecurity reduction through those strategies.

3.4 Policy Review

3.4.1 Agricultural Policy of 1997

The economy of the United Republic of Tanzania (URT) is predominantly rural based, with relatively low levels of manufacturing and value addition of the commodities produced. The weight of the agriculture sector in total gross domestic product (GDP) (Figure 1) decreased from 50 per cent in 2000 to 28 per cent in 2010, and is forecast to decline further to 18 per cent by 2025 (Government of the URT, 2010a). However, the sector's role in providing employment is forecast to remain close to 50 per cent until 2025. During the period 2001-2012, growth of the economy averaged 6.6 per cent, with peaks of 7.8 per cent in 2004/05 and 7.4 per cent in 2008/09. The services and industry sectors exhibited stronger growth rates compared

with agriculture, whose growth averaged 4.2 per cent per annum, with a high of 5.9 per cent in 2003/04 and a low of 3.1 per cent in 2002/03.

The MKUKUTA strategy outlines three clusters of activities for TDV 2025:i) growth and reduction of income poverty; ii) social services and well-being; and iii) good governance. The contribution of the agriculture sector focuses on the first cluster growth and reduction of income poverty and defines five priority areas for driving growth in agriculture. FYDP 2011/12–2015/16 was developed to reflect the global economic crisis and national capacity for managing such shocks. The implementation review of TDV 2025 states that agriculture's potential contribution to national development has not been sufficiently explored (President's Office, Planning Commission, 2011).

Delineating key functions and strategies to generate the momentum for economic growth, the plan considers agriculture as one of five key priority areas for which strategic interventions are needed.

The Agricultural Sector Development Strategy (ASDS) was adopted in 2001 to support the realization of TDV 2025 and achieve the sectoral policy objectives of MKUKUTA. The strategic objectives of ASDS are to: i) create an enabling and favourable environment for improving productivity and profitability in the agriculture sector; and ii) increase farm incomes to reduce rural poverty and ensure household food security.

To serve these objectives five strategic areas are identified: i) strengthening the institutional

framework for agricultural development; ii) creating a favourable environment for commercial activities; iii) enhancing public private roles in strengthening supporting services; iv) facilitating marketing efficiency for inputs and outputs; and v) mainstreaming planning for agricultural development in other sectors. ASDS is the main policy framework for agriculture and is accompanied by a set of subsector policies, including (ESRF, 2010).

For agricultural investment, Kilimo Kwanza(Agriculture First) a public private plan launched in 2009 by the Tanzania National Business Council aims to achieve a green revolution and boost private sector participation by increasing concessionary lending to agriculture, empowering agricultural cooperatives, creating commodity exchanges, removing market barriers to agricultural commodities, enhancing trade integration, promoting public private partnerships for investment in agriculture related infrastructure and agricultural services delivery, improving access to and use of agricultural knowledge and technologies, and accelerating land reform.

The key role agricultural growth is expected to play in reducing food insecurity is reflected across a number of key national strategies. Three strategic statements form the foundation of Tanzania's current commitment to this sector: the government's 2006-2015 Agricultural Sector Development Strategy (ASDS); the public-private Kilimo Kwanza (Agriculture First) for Tanzania Mainland; and the Agricultural Transformation Initiative (ATI) for Zanzibar. Together these documents aim to create an enabling and conducive environment for improving the productivity and profitability of the agricultural sector. Guided by these strategic documents, planned operational interventions are set out in the sector's major development programmes - the Agricultural Sector Development Program (ASDP) for Tanzania Mainland; the

Agricultural Sector Plan (ASP) for Zanzibar; and Tanzania's Comprehensive Africa Agriculture Development Programme (CAADP). Such interventions revolve around enabling farmers to have better access and use of agricultural knowledge, technologies, marketing systems and infrastructure, and to promote private investment in an improved policy environment.

Several programmes are in line with the government's increased emphasis on food markets and mainstreaming of agriculture-related interventions across ministries. For instance, to boost financial institutional development under *Kilimo Kwanza*, the Tanzania Agricultural Development Bank was established, and the Tanzania Investment Bank has helped to increase the budgetary allocation for agriculture by promoting concessionary lending to agriculture. Other measures include strengthening the role of the National Food Reserve Agency (NFRA); calling for the maintenance of food stocks for 6 to 12 months, to ensure market stability; discouraging exports of raw materials; government procurement of local products; encouraging local processing; and input subsidies.

Support to storage in 2007, the warehouse receipt system (WRS) was introduced to enable farmers to store their produce in warehouses and sell it when prices are higher.

The scheme is implemented through primary cooperatives, farmers' organizations or savings and credit cooperatives (SACCOs). Participating farmers are paid a percentage of the produce price (50 or 70 per cent), from which the prices of inputs for the following season are deducted. After storage and sale at auction by the warehouse manager, the farmer is paid the remaining percentage plus any extra gains

(less interest and administration costs). The system has been applied for cashew nuts and maize (WTO, 2012).

3.4. Literature review Summary

Enormous studies indicate that policies and strategies put in place for food crops production development have been well designed in part/theoretically but few have been done in practical. They showed most of the problems facing crops producers but not came up with practical solution on the revealed problems under food crops development.

Unreliable Market, lack of grain storage facilities, unsatisfactory capital to run farming and unclear Political willingness in food crops production has seen to be acute impediments to food crops farming.

Effective community participation into various solutions to the problems pertaining at their areas has not been fully applied. Most of the participatory approach applied have been consultative approach in which target group is just been involved at implementation stage. The need for problems solving emerged and rooted from the community in question by coming up with practical solution can help the community to attain the desired development. This mainly results from the Community Needs Assessment (CNA) which is the case of this study. This study therefore intends to come up with the construction of silos grain storage for food insecurity reduction at household level.

CHAPTER FOUR

4.0 PROJECT IMPLIMENTATION

4.1 Introduction

This chapter narrates the whole process of the project including planning and intervention of different activities to realize the predetermined objectives. Planning phase included activities to be undertaken, resources requirement (both material and human recourses) as well as the time bound for the project accomplishment. The chapter also shows output at each intervention which intends to realize the set objectives. The budget to accomplish the project has also been well indicated. The chapter also show different stakeholders who participated in the project as well as their commitment to ensure that the project is well implemented. Schedule of implementation, activities undertaken and cost of the project have been well indicated.

The silos grain storage project planned to commence on September 2014due to the contribution from each household to take long time be given to the village council. It was preliminarily planned to start on July, 201during harvesting season. Therefore the project implementation schedule was adjusted accordingly.

Among the commitment made are from the Arusha District Council through Constituency fund which provided Tsh.3500,000.00 which facilitated construction of silos grain storage while the rest is contribution Tsh.1572500 from each household who wanted silos, Other commitment includes DALDO Arusha who contributed other accessories for construction task which are processing and storage tools. Training and follow up from Arusha district council.

The anticipated goal of the project is to increased food security of Oldonyowas Village community members, hence household food insecurity reduced. Food crops development and production sustainability for the crops producers will then contribute in poverty alleviation as a whole.

4.2 Project Output

The project outputs were as follows;

i) 150 of the Oldonyowas community attend the workshop on silos grain storage project.

ii) 35 farmers were trained on managing silos grain storage project.

iii) Silos grain storage equipment purchased and construction begin

iv) Grain price is stabilizedat Oldonyosambu local market.

The outcome of the project include; reliable market for produced crops, increased crops production, increased food from crops production, hence household food security among Oldonyowas Village community members. In order to realize the goal of the project which is the construction of silos grain storage for household food insecurity reduction some activities were planned and successful executed. Some of the activities which were not accomplished include; inauguration of the silos grain storage project and the annual evaluation of the project implementation which have not yet executed but they will be undertaken once the project took off.

i. To conduct one day sensitization meeting at Oldonyowas Village concerning silos grain storage project as the beneficiaries

ii. To facilitate collection of funds from farmers for constructing silos grain storage and other equipment.

iii. To purchase construction tools/equipment

iv. To present the CNA paper to Arusha District Council (DPLO) to seek support to the project

v. To facilitate identification of Oldonyowas food crop producers who will attend the training on grain storage skills

vi. To conduct training to farmers from Oldonyowas Village on silos grain storage

vii. Construction of silos grain storage

viii. To conduct participatory monitoring and evaluation of the project implementation

ix. To conduct inauguration of the silos grain storage project

4.3 Project Planning

In order for any project to be well implemented, planning phase is of great important.

Under this project the following activities were involved in planning process

i. Identification of the project

ii. Formulation of project objectives

iii. Identification of activities to be executed to meet the predetermined objectives

iv. Identification of facilities and equipment needed in project implementation

v. Determination of person responsible for the project implementation

vi. Preparation of budget for the implementation of the project

vii. Preparation of implementation plan

4.3.1 Project Implementation Plan

The plan for project implementation prepared. The work plan and schedule showing activities to be implemented output and objectives prepared. Resources both material and human resources indicated well. However, the schedule on when to implement a specific activity by using months also indicated. The implementation executed under the implementation plan as it is well indicated in ***Table 9.***

The main activities under the implementation were coordination of activities, supervision as well as monitoring and evaluation. Project monitoring allowed the project flexibility on the undertaken activities to ensure smooth implementation of the project and that activities are done as per plan. Evaluation process has been ensuring whether or not the planned interventions are carried out under the right track. In general the plan helped at large in realizing the set objectives and built the cohesion among the project implementers and other stakeholders.

The project implementation resources contributed by various stakeholders including; Oldonyowas District Council (Oldonyowas Village government inclusive), and individual farmers who wanted silos. Apart from materials resources, Arusha District council provided project professional for training and follow ups on the project implementation. The CED students contribution in facilitating trainings and advice in project management, planning, collaboration with various development partners, implementation, and ensured participatory monitoring and evaluation of planned activities.

Table 9 Projected Implementation Plan

Objective	Output	Activity	Implementation plan monthly							Resource needed	Responsible person
			AUG	SEP	OCT	NOV	DEC	JAN	FEB		
1Sensitizing community on silos grain storage project.	150 community member attend workshop	Outsource expert								Human, Funds, Stationery, Transport	CED student DALDO Village leaders, farmers, stakeholders.
		Conduct workshop								Human, Funds, Stationery, Transport	CED student DALDO Village leaders, farmers, stakeholders
2. Facilitating on building skills and knowledge on managing silos project.	35 farmers were trained on managing silos grain storage project	Practical skills on how to manage silos grain storage								Human, Funds, Stationery, Transport	CED student DALDO Village leaders, stakeholders
		To facilitate identification of Oldonyowas								Human, Funds, Stationery, Transport	CED student DALDO Village leaders,

		farmers who will attend the training silos grain storage									stakeholders
3 To assist in raising fund for better intervention of the project	Project tool/ equipment purchased	To purchase silos construction equipment								Human, Funds, Stationery, Transport	DALDO Village leaders,
	Silos grain storage construction	Constructing silos grain storage								Human, Funds, Stationery, Transport	CED student DALDO Village leaders, stakeholders
4 To create reliable market	Grain price stablelization at Oldonyosambu local market	Standardize the price to all traders								Human, Funds, Stationery, Transport	CED student DALDO Village leaders, stakeholders
		Formation of grain produces cooperation.								Human, Funds Stationery, Transport	CED student DALDO Village leaders, stakeholders

	Inauguration of the silos grain storage project conducted	To conduct inauguration of silos grain storage project								Human, Funds, Stationery, Transport	CED student DALDO Village leaders, stakeholders
	Participatory monitoring done	Conducting participatory mid-term and annual M&E of project implementation								Human, Funds, Stationery, Transport	CED student DALDO Village leaders, stakeholders

4.2.1.1 Logical Framework

Logical Framework is an analytical tool which is used to plan, monitor, and evaluate projects. Its name have been derived its logical linkages/relationship set by the planner in order to bring about connection between project means and its ends. The Logical Framework which has been used here is a logic Matrix. A logical Framework as a Matrix has a standard form in its representation. The format which has been used in this framework is sometimes known as a four by four Matrix. It consist a vertical logic which show the hierarchy of objectives, sometimes it is known as Narrative summary.

It describes arrangement of objectives logically. It starts with Goal followed by objective, then Outputs and activities. The matrix allow the planner to arrange objectives in logical order by asking simple questions such as; what objectives are needed to achieve this goal? What output are expected to realize objectives? And then what activities should be done to realize the outputs? After the question on output the last variable which not necessarily to be within the matrix is what inputs are needed to undergo the planned activities?

The horizontal logic shows the progress against each objective. It clearly shows indicators and its means of verification as well as external factors which might hinder the fulfillment of the concerned objectives (Assumptions). In planning for the assumptions killer assumptions have been evaded and encouraged positive assumptions to show that the objective can be achieved. It is advisable that once there is killer assumptions nullify or change the project before committing resources. Under this project Goal, Objectives, Output and activities and Assumptions have been well indicated in ***Table 9***

Table 10 Logical Framework.

Hierarchy of Objective	Objective verifiable indicator (OVIs)	Means of Verification (MOVs)	Assumption
Goal (Impact): Household food insecurity reduction to food crops producers.	Household food security status	Annual production report	Willingness of the people to disclose food status while asked
Objective 1. Sensitizing the Oldonyowas community members on silos grain storage project by August 2014			
Output 1. 150 community member attend workshop	Number of Oldonyowas community members sensitized on the silos grain storage project	Project progressive reports	Positive response from the Oldonyowas Village community members to attend at the workshop
Activity			
1.1 Outsource expert	New ideas created	Training report	Well done training
1.2 Conduct workshop	Number of the community attend the training	Project progressive report	Excellent participation and attendance of the community in the training
Objective 2 Facilitating on building skills and knowledge on managing silos grain storage project by September 2014			
Output 2.35 farmers were trained on managing silos grain storage project	Number of farmers and Village leaders gained knowledge and skills on project running and management	List of participants attended the training	Farmers and Village leaders will attend the training
Activities			
2.1 To facilitate identification of Oldonyowas farmers who will attend the training silos grain storage**.**	Number of farmers identified and attended the training	Project progressive report	Excellent participation of farmers.

2.2 Practical training skills on how to manage silos grain storage**.**	Number of farmers trained.	Training report	Selected members who will attend the training
Objective 3 To assist in raising fund for successes full intervention on the silos grain storage project by October 2014			
Output 3.1 Different stakeholders contributed materials and non-materials	List of stakeholders with their contribution	Records of material support in project	Positive willingness from the stakeholders to contribute to the project
Output 3.2 Construction of silos grain storage	Status of silos grain storage construction	Project progressive report	Fund for purchase and installing fruits processing machine available
Activities			
3.1 To purchase tool/Equipment for silos construction.	Number of silos construction equipment/tools purchased/procured	Project Equipment procurement/collection report	Fund and time for purchasing and collecting equipment will be available
3.2 Constructing Silos grain storage	Construction stages	Silos grain storage construction report	Task will be conducted successful
Objective 4. To create reliable market for grain's by February 2015			
Output 4.1 Grain price stablelization at Oldonyosambu local market	Numbers of traders using uniform adjusted price	Project Crops selling report	All the farmers will have the same price during selling crops due to storage.
Activity			
4.1 Standardize the price to all crops traders	Presence of regulation on price	Project Crops selling report	All farmers will have the same price

4.2 To conduct inauguration of silos grain storage project	Project inauguration document in place	Project inauguration report	People will be willing to participate at project inauguration day
4.3 Conducting participatory mid-term and annual M&E of project implementation	Number of people participated in the evaluation	Mid-term and annual evaluation report	M&E Member will participate effectively in the exercise

4.2.2 Project Budget

The estimated project annual budget was **5,702,500** in which Tsh 4,700,000being tools and equipment for construction while 1,002,500 will be used in training monitoring and evaluation. In implementation fuel for sensitization meetings have been facilitated by DED Arusha. A sum of Tsh. **3,700,000** was cash from Arusha District Council (Constituent Fund). Other contributions were from individual farmers who wanted to have their own silo and other stakeholders as elaborated under below. The detailed budget for the fruits processing project is indicated in ***Table 11*.**

Table 11: Project budget.

Objective	Output	Activity	Resource needed	Quantity	Unity price	Total TZS.
1Sensitizing community on silos grain storage project.	150 community member attend workshop	Outsource expert	Facilitators allowances	**2**	**35,000**	**70,000**
			A4 paper – reams	**2**	**10000**	**20,000**
		Conduct workshop	Lunch for participant	**150**	**2,500**	**375,000**
			Generator fuel	**12ltrs**	**2,200**	**26,400**
2. Facilitating on building skills and knowledge on managing silos project.	35 farmers were trained on managing silos grain storage project	Practical skills on how to manage silos grain storage	Stationary flip chart	**2**	**10000**	**20,000**
			Mark pen	**10**	**6000**	**60,000**
			Fuel ltrs	**5**	**2200**	**11,000**
		To facilitate identification of Oldonyowas farmers who will attend the training silos grain storage	Facilitation Allowance	**2**	**35000**	**70,000**
			Soft drinks and snacks	**35**	**1000**	**35,000**
			Note books	**35**	**1200**	**42,000**
			Pens	**40**	**200**	**8,000**
3To assist in raising fund for better intervention of the project	Project tool/ equipment purchased	To purchase silos construction equipment	Tools	-	**4,700,000**	**4,700,000**
			Transport cost	**4**	**10,000**	**40,000**
			Participant allowance	**4**	**10,000**	**40,000**
	Silos grain	Constructing silos	Constructers	**2**	**700,00**	**1,400,000**

	storage construction	grain storage			**0**	
			Labor charge	**4**	**5,000/day**	**280,000**
To create reliable market for grain.	Grain price stablelization at Oldonyosambu local market	Standardize the price to all traders	Time	-	-	**0**
			Time	-	-	**0**
		Formation of grain produces cooperation.	Time	-	-	**0**
			Time	-	-	**0**
	Inauguration of the silos grain storage project conducted	To conduct inauguration of silos grain storage project	Fuel	**5ltrs**	**2200**	**11000**
			Lunch	**50**	**2000**	**100,000**
			Participant allowance	**5**	**20000**	**100,000**
	Participatory monitoring done	Conducting participatory mid-term and annual M&E of project implementation	Participant allowance	**10**	**20000**	**200000**
			Fuel	**15**	**2200**	**33000**
GRAND TOTAL				**5,702,500/=**		

4.3 Project Implementation Report

The project implementation commenced on August 2014 for undertaking preliminary stages of the project, the activities were executed sequentially which facilitated the effective realization of the set objectives. The responsible persons for the smooth

implementation of the project were the CED student, host organization leaders, and selected members from farmers.

Project implementation executed in a participatory way which involved different stakeholders in order to successful implements the project. This approach was useful for it gave the way for the participants to get experience from one another on how to undergo successful project implementation. Furthermore the participatory approach whereby local people are fully involved at every stage of implementation ensures project sustainability on the side of management and creativity.

These concur with Lifting (2001) who revealed that, local people starts as clients of the project as they go on they become clients of the project, ultimately they become managers. This means that as they participate thoroughly throughout the project implementation they become experts on how to run and managed the projects.

The task was successful achieved in collaboration with different stakeholders who were and are interested with the project. Under this intervention the ultimate result was liable accessibility grain which then planned to contribute into reducing food poverty at household level. It is obvious that, not only silos grain storage can effectively reduce household food poverty but will apparently contribute to reduce it in conjunction of other storage facilities from other sources. In order for the project implementation to be implemented as it was planned, close monitoring was conducted by farmers in collaboration with the Village leaders. The CED student had to participate in the monitoring exercise in collaboration with the group monitoring team from the starting days to familiarize the group members on the monitoring tasks for the day to day interventions.

Evaluation activities was undertaken in terms of pre-evaluation which helped to detect the project feasibility and viability, intermediate evaluation to see whether the project activities are carried as planned. However, monitoring and evaluation allowed flexibility of activities to suit the prevailed environment of implementation so as to realize the predetermined objectives and goal. Mid and annual evaluation is expected to be conducted soon after the project take off.

Unfortunately, apart from many grains being destroyed the construction was done while few grains remained because its season was over. Few crops obtained (grains) used for practical training on how to undergo grain storage..

In general the establishment of silos grain storage at Oldonyowas Village will help rescuing household who used to be more affected due to unreliable market especially during post-harvest. It will also influence more peasants to engage into food crops production having seen assured market of their fellow products.

Figure 10 Village Chairperson discussing with the Farmers the location of Silos grain storage.

Figure 11 Silos constructors continuing with the activity.

Figure 12 One of the complete Silos grain storages ready to be used.

4.3.1Project Implementation Gantt chart

Table 12: Project implementation Gantt chart

Objective	Output	Activity	AUG	SEP	OCT	NOV	DEC	JAN	FEB
1Sensitizing community on silos grain storage project.	150 community member attend workshop	Outsource expert							
		Conduct workshop							
2. Facilitating on building skills and knowledge on managing silos project.	35 farmers were trained on managing silos grain storage project	Practical skills on how to manage silos grain storage							
		To facilitate identification of Oldonyowas farmers who will attend the training silos grain storage							

3To assist in raising fund for better intervention of the project	Project tool/ equipment purchased	To purchase silos construction equipment							
	Silos grain storage construction	Constructing silos grain storage							
To create reliable market for grain.	Grain price stablelization at Oldonyosambu local market	Standardize the price to all traders							
		Formation of grain produces cooperation.							
	Inauguration of the silos grain storage project conducted	To conduct inauguration of fruits processing project							
	Participatory monitoring done	Conducting participatory mid-term and annual M&E of project implementation							

CHAPTER FIVE

5.0 PROJECT PARTICIPATORY MONITORING, EVALUATION AND SUSTAINABILITY

5.1 Introduction

Chapter five discuss about project participatory monitoring, evaluation and sustainability.Monitoring helps determine whether a project is on track and if any of its strategies or activities needs to be changed so that it can be as successful as possible. Evaluation helps assess the impact of project activities on desired outcomes, like knowledge or behaviour change. Monitoring and evaluation are linked together since monitoring sets benchmarks for evaluation. Thus monitoring and evaluation help to gather information needed to keep the project on schedule and predict problems as well as formulate solutions, measure progress and evaluate program success.

Participatory monitoring and evaluation give opportunity to all participants to be involved in all stages of the project implementation and it make them to be the owners of the project, under this part project progress is determined once problems and challenges concurred during implementation, with participatory evaluation participants get chance to discuss and resolve the problems and find the way to overcome challenges soon.

This chapter has been divided into nine parts, namely; Participatory monitoring, monitoring information system, participatory monitoring methods, participatory monitoring plan, participatory evaluation plan, performance indicator, participatory evaluation methods, and project evaluation summary as well as the project sustainability.

5.2 Participatory Monitoring

Monitoring is a continuous assessment that aims at providing all stakeholders with early detailed information on the progress or delay of the ongoing assessed activities. It is an oversight of the activity's implementation stage. Its purpose is to determine if the outputs, deliveries and schedules planned have been reached so that action can be taken to correct the deficiencies as quickly as possible (Roni, 2005).Participatory Monitoring can take various forms. At its core, it should be about inclusive and transparent practices used to monitor the effectiveness and usefulness of local, regional, national or international policies, thus providing the evidence to improve upon said policies. It’s about people working together in an organized way, identifying and tracking the priority issues that affect their own communities, so that barriers to progress can be addressed and solved, with support as necessary from public sector and other accountable institutions.

Participatory monitoring and evaluation therefore; are extremely important for learning about the achievement/deviation from original concerns and problems faced by local development projects or programs being implemented, so that corrective measures can be taken in time.

Participatory monitoring is the process in which the monitoring task done by involving the respective persons. For the case of grain storage the members fully participated in the monitoring their daily activities so as to realize the predetermined objectives. The monitoring was undertaken on all activities arranged to be performed in the project. The essence was to determine the progress of the planned activities. Participatory monitoring was a useful tool for it gave opportunity to respective

stakeholders to be aware of all activities undertaken in the project and it helped them to make their useful decision in different aspects.

5.2.1 Monitoring Information System

Monitoring Information System (MIS) is directly linked to management by objectives and to the monitoring of key performance indicators. It can also help in processing specific information for decision-making. The Silos grain storage project used the Monitoring Information System to establish data bank collected from different planned activities implemented in a certain period. The collected and kept data helped in the smooth run of the project and to find solution of the impediments occurred in the implementation process. Among the information which was needed by the project were; Number of farmers. Different information which were required by the project include; equipment requirement, inventory of project equipment, collection of funds, different project stakeholders, training requirements, market on the products, customers and members of the project. Accessibility of such information helps managers or leaders to arrange good plan for the project implementation, plan for monitoring and evaluation.

Managing a project and multiple resources requires many carefully thought out steps. At each point decisions must be made on the basis of available data. Moreover, once the program is under way data for checking and analysis are required for effective monitoring and evaluation. Some programs will already have some of these data available. Where collection systems are lacking they can and should be designed and implemented at all levels and locations.

Under this system, a daily record book/sheet was prepared to enable all information to be entered for the use of different stakeholders including farmers themselves. The assigned grain storage project members were responsible for recording daily project records for project development and for the preparation of the reports for different intervals. Normal intervals in silos grain storage project was quarterly and annual reports.

5.2.2 Participatory Monitoring Methods

Proponents of participatory monitoring argue that it is more cost-effective, accurate and sustainable than conventional approaches, different methods and techniques employed to ensure maximum participation of the farmers in monitoring the underlined project activities. O&OD and PRA methods were used in participatory monitoring. However, observations on the task in question, interview, discussion, and documentation tools were well utilized in the participatory monitoring. Under this approach the group members got chance to encourage others to another on food crops production at Oldonyowas community.

5.2.2.1 Key informants interview

Key informant interviews are a rapid assessment methodology that can be used as an intermediate indicator of outcomes as an alternative or supplement to full impact assessments. In the implementation of the project some addition information were needed to some key informants including; District officials, Ward leaders, Village leaders, and farmers.

5.2.2.2 Documentation

Different document pertaining the silos grain storage project were to be kept in good order. The documents prepared and kept included; important letters from Arusha District Council, Different receipt books and payment vouchers, different minutes for various meetings, list of project equipment and project market information. The project funding records was the necessary document to be kept into good custody for successive implementation of the project. The CED student assisted the group members on the good way of writing and keeping different report in good manner.

5.2.2.3 Observation

Observation was another useful way used by the farmers in collaboration with the researcher, village leaders and extension officers to see if the planned activities were implemented smoothly as planned. Under observation project equipment procured, training participants, and the sensitization meeting attendants were well observed and justified. Another observation task will include the real project take off and the inauguration activity which are both under construction.

5.2.2.4 Participatory Evaluation Methods

Both Participatory Rural Appraisal (PRA) and Opportunity and Obstacles to Development (O&OD)methods were used according to the environment, available resources, and the kind of activity to be evaluated. These methods helped at large commencing at the preliminary stage of evaluation plan preparation whereby all stakeholders participated fully. By conducting group discussion, preparation of the evaluation schedule, direct observation and making step by step participatory evaluation, PRA and O&OD techniques were well enhanced and utilized.

Among the evaluation areas by the help of readily available work plan was; the extent at which each planned activity is executed, achievement of the set targets and Objectives, project development and success, the impact/outcome of the project and the opportunity for project sustainability. The task was facilitated by the prepared checklist at every component/activity which used as a guideline to attain high level of participatory evaluation. Observation tool was useful in seeing how the community harvests their crops them before they get rote and collect to the silos and how they store.

Under participatory monitoring most of the activities were successful implemented and it builds the cohesion among the actors in the project which ensures the sustainability of the project after the project time. This is due to the fact that majority of the participants have been aware of many stages of the implementation task and the essence of the project for their future betterment.

5.2.2.5 Project Evaluation Summary

The project evaluation summary based on the extent at which project goals and objectives have been realized. Performance indicators used as a means of verification on the particular variable. The expected outcomes were related by the actual outcomes to see the level of intervention of the particular activity assisted by the predetermined indicators. Many of the planned activities have been implemented as well as realizing some objectives. However, evaluation on mid and annual of the project was not done. This will be conducted later. Another important evaluation which has been done is on the nature of crops currently produced in Arusha, necessitate the project to be seasonal because there are some months without any type of crops to store.

5.3.2 Project Sustainability

Project sustainability is the goal of creating and successfully launching a project that is capable of continuing to generate benefits for an extended period of time. This concept of sustainable project development posits that once the project is launched and begins to generate some type of benefits, it is possible to continue utilizing the same general approaches to allow the project to continue moving forward, supplying those benefits for as long as necessary. As part of the process, the project will often produce resources that can be used in that ongoing operation, making the project worth the time and effort to continue.

The particulars of project sustainability will vary somewhat, depending on the nature of the project itself. As a rule, efforts to build sustainability into a project early on is a good approach, since attempting to integrate that type of ongoing benefit later on can be somewhat difficult. For the case of Oldonyowas grain storage project the sustainability have been translated in their own approach basing on the key factorenable the project to sustain. The project has focus on the reliable market for the project produce. In order for the project to be sustainable the project stakeholders used the Participatory monitoring and evaluation at every stage of the project implementation to empower the farmers to be able to run the project themselves. This means that project leaders must be looking at not only the nuts and bolts of structuring a project, but also the eventual outcome and how the effort can continue to produce results for a number of years.

5.3.1 Institutional Sustainability

Institution sustainability requires compliance with current standards as well as providing a viable means of allowing the project to generate benefits on an on-going

basis. Those standards are often determined by considering governmental regulations relevant to the project as well as the production and quality standards. Attention is usually paid to consumer wants and needs as a way of determining if the results of a project will likely be attractive enough to generate demand that will continue for an appreciable period of time. Individual farmers have been trained on how to run the project successful for the better product.

The grain storage project members have been trained on business planning and Management, this will contribute at large in project sustainability. The GSP members have been participated in project monitoring and evaluation under PM&E executed by the CED student which will contribute in the project sustainability.

Provided the farmers have been participating from the preliminary stages of the project intervention, they have gained an experience which will suffice them to run the project by themselves. The training conducted on how to run the project will facilitate them to undergo various activities concerning grain storage. Moreover, the use of effective Participatory Monitoring and evaluation has created the sense of project ownership to all farmers which allow them to continue with the project even after the project time finished.

The market for stored products will be within the Village, local market such as Oldonyosambu which is the most important market at Oldonyowas village, Ngaramtoni market and Arusha town which is 23km long.

CHAPTER SIX

6.0 CONCLUSION AND RECOMMENDATION

6.1 Introduction

This chapter provides an overall picture of grain storage project at Oldonyowas Village. It gives the summary of the whole process and steps undertaken since the identification of the project, problem identification up to the project implementation outputs. The areas which have been summarized in this chapter include; Community Needs Assessments (CNA), Problem identification, Literature review, Project implementation, Participatory Monitoring, Evaluation, and ultimately the sustainability of the project. In general, the chapter shows in other way what have been discussed in all chapters.

6.2 Conclusion

Minimizing post-harvest losses is a very effective way of reducing the area needed for production and thereby increasing food production efficiency. By preventing post-harvest losses, the household silo also becomes an important technology for enhancing food security, particularly for small-scale farmers in the developing countries. In most countries where the silo has been introduced, the silo has created a positive impact among stakeholders directly or indirectly associated with the grain production and storage. Continued progress in solving post-harvest storage problems via silo promotion will require cooperation and effective communication among government organizations, non-government organizations, manufacturers and farmers.

Oldonyowas Village is one among the villages affected by food insecurity in Arusha District. Different strategies have been employed to facilitate community members to

pull out of hunger, but still majority are trapped in food insecurity. The Oldonyowas grain storage project is an ideal strategy which comply the National strategy to alleviate hunger in Tanzania as well describe in MKUKUTA II. It also goes in line with the Tanzania Agricultural Livestock Policy which envisages increasing food to the people through production of different crops and storage promotion respectively. The CNA conducted by Oldonyowas community members in collaboration with the CED student revealed the prevalence of the fertile land suitable for different crops production which is the opportunity for food availability to the community members, hence economic development.

For a long time Oldonyowas people were depending on grain crops as a main food crop but it came to pass that the ways of store them become a challenge, the farmers were demoralized in the production of such crops. Currently grain crop has been one of the cash crops for some Oldonyowas Population. However, farmers have been facing different problems including; unreliable market for their product, rotting of grain due to lack of proper storage facility and knowledge on how to store their crops.

The literatures concerning food crops production in Tanzania, unveil the fact that much of the crops have been rotting and sometimes sold in very low price due to unreliable market and lack of storage facilities which could have rescued the situation. Storing food crops can be kept for a long time and be sold in reasonable price which in turn encourage more producers to engage in its production. Absences of silos grain storage exacerbate food poverty among the community members in the respective areas.

In the implementation of silos grain storage project some objectives have been fully achieved while few have not been realized. The planned objectives were not changed over the implementation period. In order to ensure that the project implementation ultimately bring about sustainable economic development, the stakeholders plan and managed to involve the community members (local people) in this case farmers, and different stakeholders in the whole process of the project from the preliminary stage of project identification, project planning, project implementation and project monitoring and evaluation of planned activities.

On the other hand participatory monitoring and evaluation is very useful for successful project implementation and for its sustainability because it allows local people to participate in all process of the project intervention. It also creates a sense of ownership for the project group members hence, project sustainability.

It is therefore expected that the Oldonyowas farmers will benefit from storing their crops at their own silos after the project take off. Provided grains will be stored, it is expected that the products will be sold in high price than before which will lead to increased income of farmers. The successful implementation of the project will encourage many farmers who are not yet engaged in food crops production together with other to engage into food crops production.

From the policy perspectives, national agricultural development strategies need to guarantee the availability of effective community-based storage infrastructure. This would have a positive effect on the food security situation and food prices, especially in the scenarios where crop yields are low, total farm outputs are small, or diets are insufficiently diversified in communities with high dependency on a few staple

foods. Indeed, targeting of postharvest technologies based on crop livestock production systems is likely to improve food security.

6.3 Recommendations

According to literature review, good policies on how to promote food crops in Tanzania have been well analyzed but there is no implementation and close follow up on the laid down strategies. However, problems and challenges faces farmers in Tanzania including unreliable market have been identified and well analyzed. The government in collaboration with other stakeholders should act on the analyzed problems to promote food crops production as one of the agriculture products. The government should ensure reliable market for food crops product and to ensure the sustainability of the food production.

Reducing harvest losses in developing countries can have a direct positive impact on the year round availability of nutritious food for households and communities. In addition, it helps smallholders to increase their incomes and as such increases access to food for the poor. However, when the goal is to have a more regional or national impact, the success of food storage interventions for enhancing food security depends on the degree to which these are embedded within a broader value chain approach. This suggests storage facilities, infrastructure, means of transport and market access is all taken into account.

Different stakeholders should abide in participatory monitoring and evaluation which create a clear opportunity to various participants to air out their views and contribution on the issue in hand. When a person is well participated in the whole process of project design and implementation he/she become familiar of all activities

in the project and devote his/her efforts to ensure the project implementation. This then will simply bring about project sustainability because they become part and parcel of the project. Therefore participatory monitoring and evaluation should be encouraged.

In conducting the assessment exercise; accurate, valid, and genuine data are very important and results to sound CNA exercise which lead to unveil a real core problem of the community in question.

Participatory assessment gives chance to the community members to know various problems pertaining in their community and find possible solutions together. Participatory assessment should be representative of the community under study in order to capture all important areas.

It is important to note that activities to reduce pre- and post-harvest losses mainly have an effect on the availability of food, as reducing loss increases the amount of food available. Reducing food loss also, to a lesser extent, delivers an impact on other aspects of food security such as access, utilization and stability of the food system.

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APPENDICES

Appendix 1 : Crops Production Questionnaire

CROPS PRODUCTION QUESTIONNAIRE

Title: Improving food security by constructing silos grain storage among the famers at Oldonyowas village in Arusha District.

1.0 **Personal general information**

1.2 Age 1=20-30, 2=31-40 3=41-50 4=51>

1.3 Gender: 1= Male, 2= Female

1.4 Marital status: Cycle the respective answer

1=Single, 2=Married, 3 = divorced, 4 = widow

1.5 Occupation: 1= Peasant, 2= Employed, 3= businessman, 4= Livestock –keeping

1.6 Education of respondents

a). None, b). Adult education, c). Primary education, d). Form four level, e).form six level,

f). Tertiary

1.7How many are you in your household? 1=1- 2, 2= 3-4, 3= 5-6, 4= above 6

Food security status at oldonyowas

2.1 What kind of crops do you mostly prefer to cultivate?

1=maize 2= beans 3 =both

2.2 Do your family members access food throughout the year?

1= Yes 2= No

2.3 How many meals do your family gets a day? 1= 2, 2=3, 3= 4, 4= more than 4

2.4 Which type of method are you using to store crops?

1= drying, 2= Packing to the fiber sacks 3= we don't store

3.0 food crops contribution to income

3.1 Is there healthy and sustainable food production in your community?

Hypothesis 1=strongly disagree 2=Disagree 3=Agree 4=strongly agree

3.2 Is food crops production having anything to contribute in your income earning?

1=Yes, 2=No

3.2.1 If yes how much have you earned from apples production in 2014? 1= 10,000-50,000, 2= 51,000.00-100,000.00, 3= 101,000.00- 200,000.00, 4= 201,000.00-500,000.00, 5= above 500,000.00

3.3 What is your opinion on food crops production potentials in your income earning? 1= It is very useful, 2= useful, 3= Do not know 4= not useful, 5= Very un-useful

4.0Perception of Oldonyowas people on food crop production

Hypothesis	**Strongly disagree**	**Disagree**	**Agree**	**Strongly agree**
4.1Majority of Oldonyowas community do engage in food crops production				
4.1.2 Lack of remarkable market for food crops reduces production efforts				
4.1.5 Lack of silos grain storage at Oldonyowas have led people to sell their crops immediately after production				

Table 13 Perception of Oldonyowas people on food crop production.

4.2 What are the problems associated with food crops farming? 1= Inaccessibility of market during rain, 2= Lack of market, 3= Low price 4= Storage facilities

4.3 What is your opinion on food crops farming promotion? 1= expanding market through advertisement, 2= construction of silos grain storage,

Thank you for your cooperation

Appendix 2 : Application Letter to the Host Organization

APPLICATION LETTER TO THE HOST ORGANIZATION

INNOCENT ESTOMIH

LO-THANG,

S.L.P 1422,

ARUSHA.

01/08/2014

MWENYEKITI WA KIJIJI,

KIJIJI CHA OLDONYOWAS.

S.L.P 1470,

OLDONYOSAMBU,

ARUSHA.

YAH: OMBI LA KUFANYA UTAFITI KATIKA KIJIJI CHAKO

Husika na somo la hapo juu.

Mimi ni mwanafunzi ninayesomaDegree ya UzamilikatikaChuoKikuuhuria Tanzania. Baada ya kukamilishamasomo ya ndanisasa ni muda wakufanyautafitiilikukamilishamasomoyangu. Kutokana na aina ya utafitiniliouchaguanaombakufanyautafitihuokatikakijiichakocha Oldonyosambu. AidhakatikautafitihuomatokeoyautafitiyatashirikishwakwenyeHalmashauriyako ya kijijiilikupataufumbuziwa mambo yatakayokuwayameainishwakatikautafitihuo.

Ni matumainiyangukuwautalikubaliombilangu,

Ndimi

INNOCENT.E LO-THANG

Mwanafunzi.

Appendix 3 : Response from the Host Organization

APPENDIX 3: RESPONSE FROM THE HOST ORGANIZATION

HALMASHAURI YA KIJIJI CHA OLDONYOWAS

S.L.P 1470,

OLDONYOSAMBU,

ARUSHA.

05/08/2014

Ndugu;

INNOCENT ESTOMIH L,

S.L.P 1422,

ARUSHA.

YAH: OMBI LAKO LA KUFANYA UTAFITI KATIKA KIJIJI CHA INIHO

Somo la hapo juu lahusika.

Nakirikupokeabaruayakoisiyo na KumbukumbuNamba ya tarehe 01/08/2014. Nafurahikukujulishakuwaombilako la kufanyautafitikatikakijiichetucha Oldonyowas limekubalika. AidhawananchiwaKijijicha Oldonyowas wakotayarikutoaushirikianowaokatikakufanikishautafitiwakokwamaslahi ya kijijichetukwanitunatambuakuwautafitihuokwanamna moja aunyingineutatuhususisiwananchiilikujikwamuakatikamatatizombalimbaliyanayotusibu. Karibusana Oldonyowas.

Nakutakiakazinjema,

Peter Ole Laizer

VEO – OLDONYOWAS

Appendix 4 : Silos Grain Storage Project Budget

SILOS GRAIN STORAGE PROJECT BUDGET

BREACKDOWN

Table 14 Silos Grain storage project budget breakdown.

No.	BUDGET LINE ITEMS	QUANTITY	UNIT PRICE	TOTAL
A	**CONSTRUCTION COST**			
1	Breaks	35 silo@45	900	1,417,500
2	Cement	35 silos @5	15000	2,625,000
3	Wire mash	35 silos@5pcs	80,000	350,000
4	Workers uniform	4 pairs	20,000	80,000
5	Sand	3 tons	200,000	600,000
	GRAND-TOTAL			**5072500/=**